FOUNDRY
EST. 1902
TRADE JOURNAL
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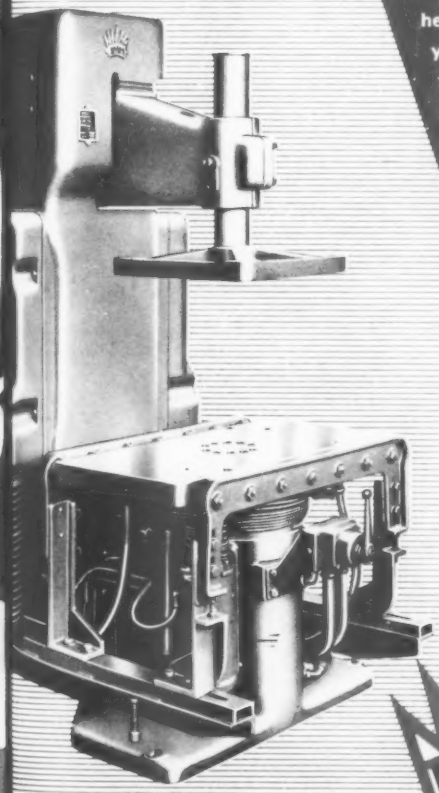

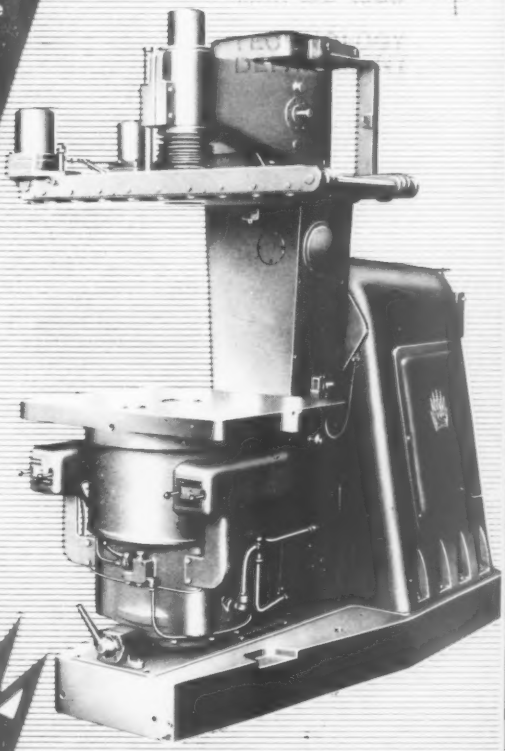

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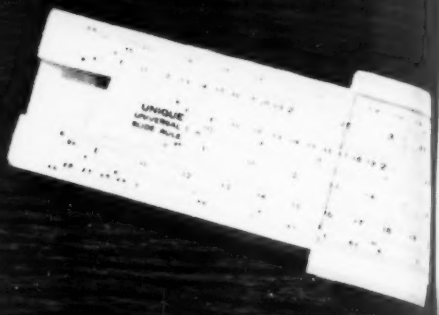

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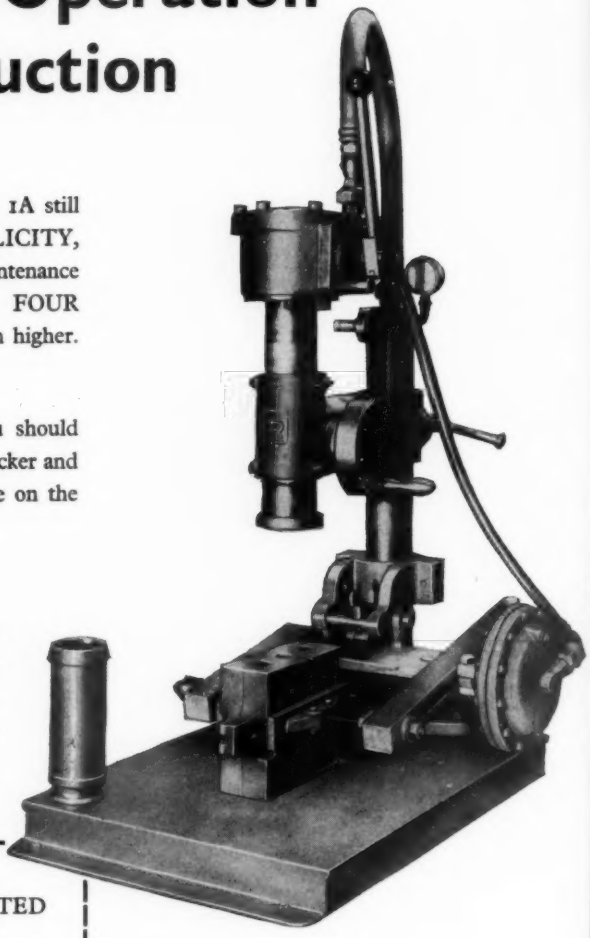

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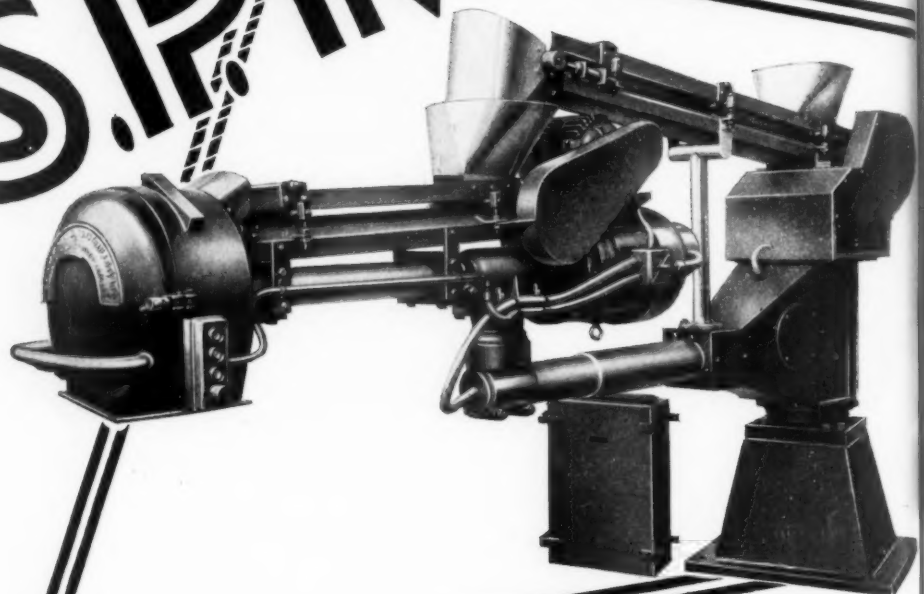

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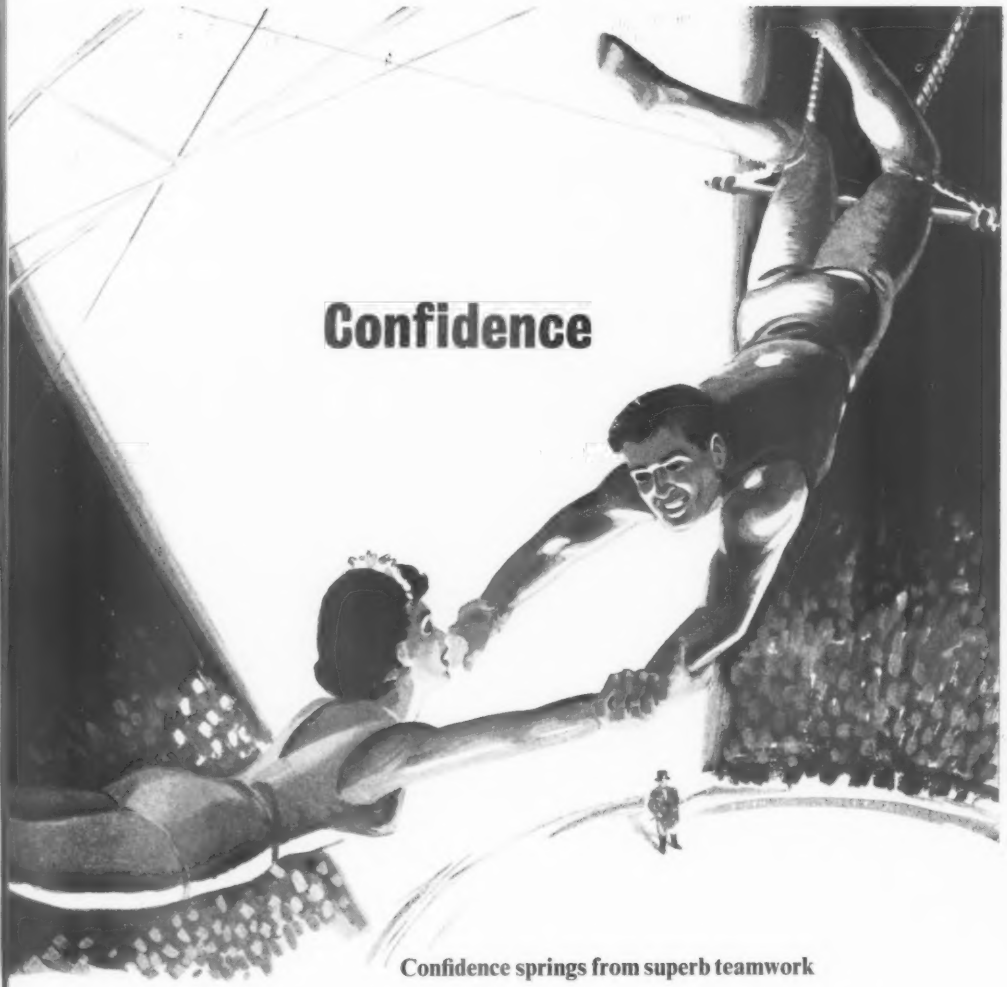

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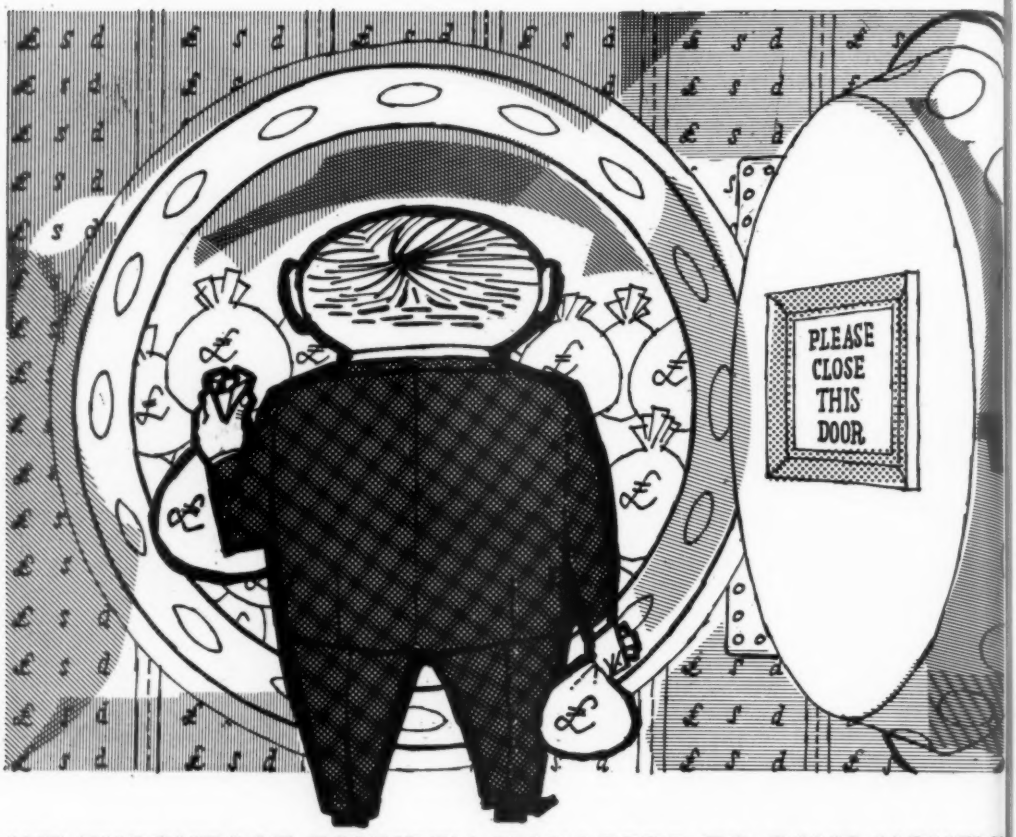

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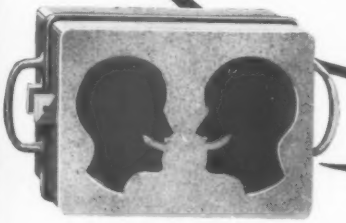

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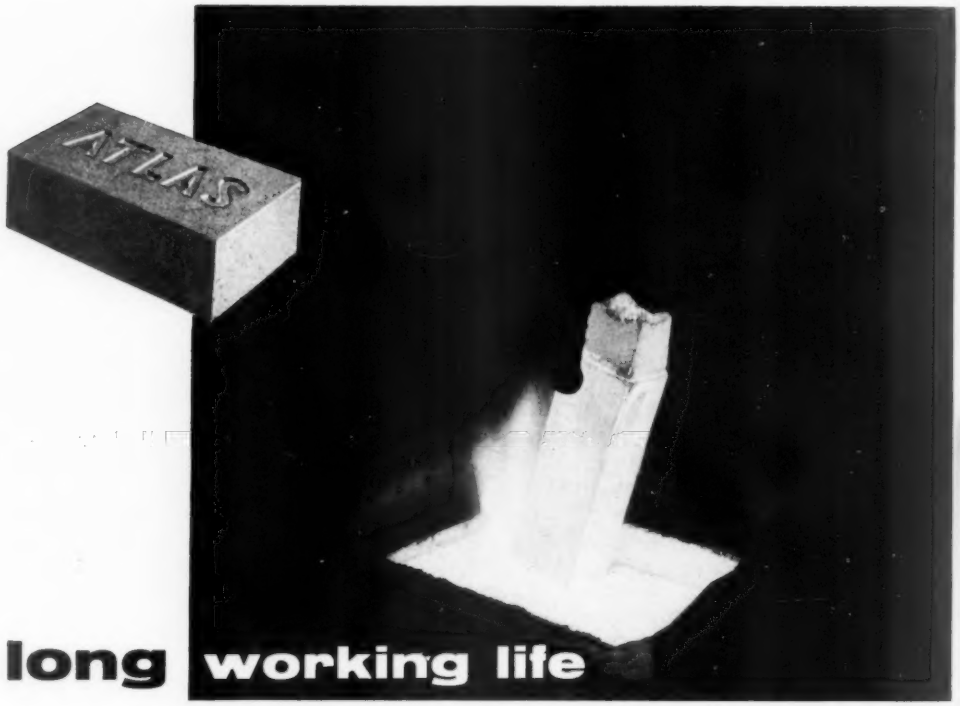

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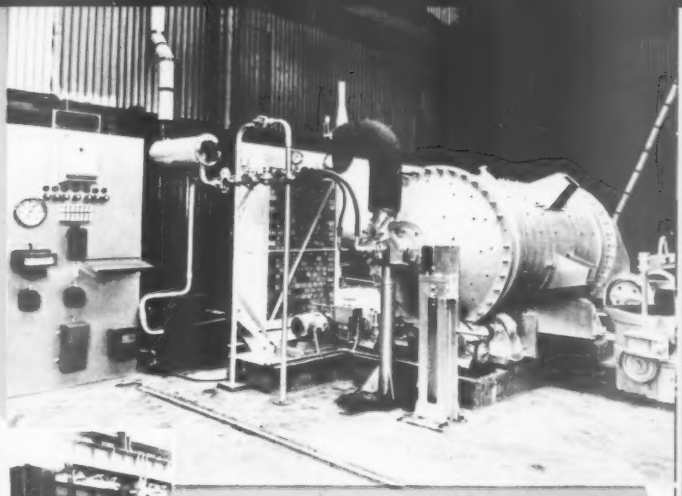

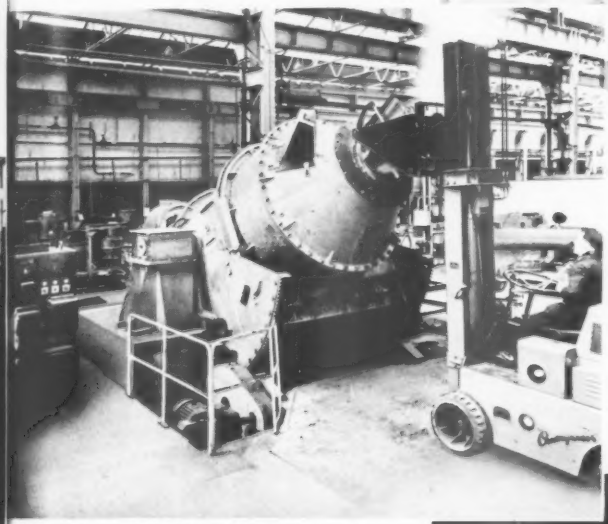

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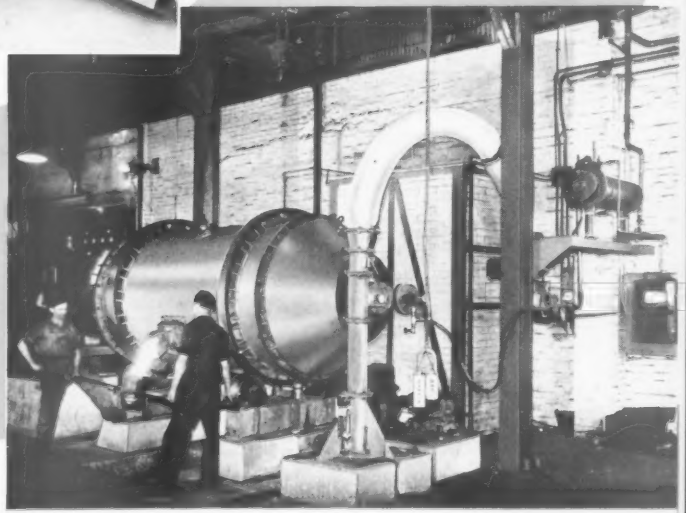

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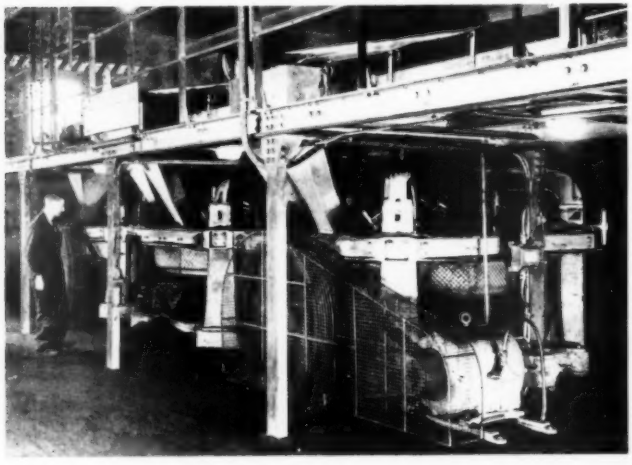

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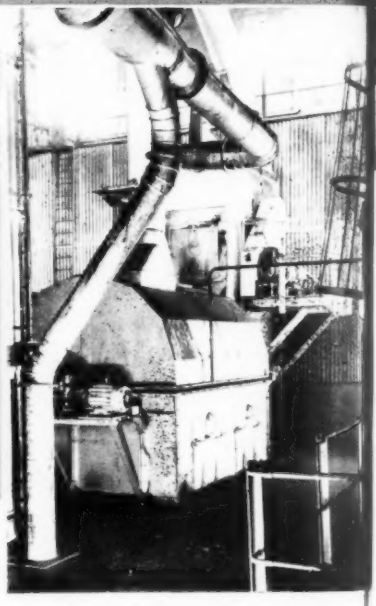

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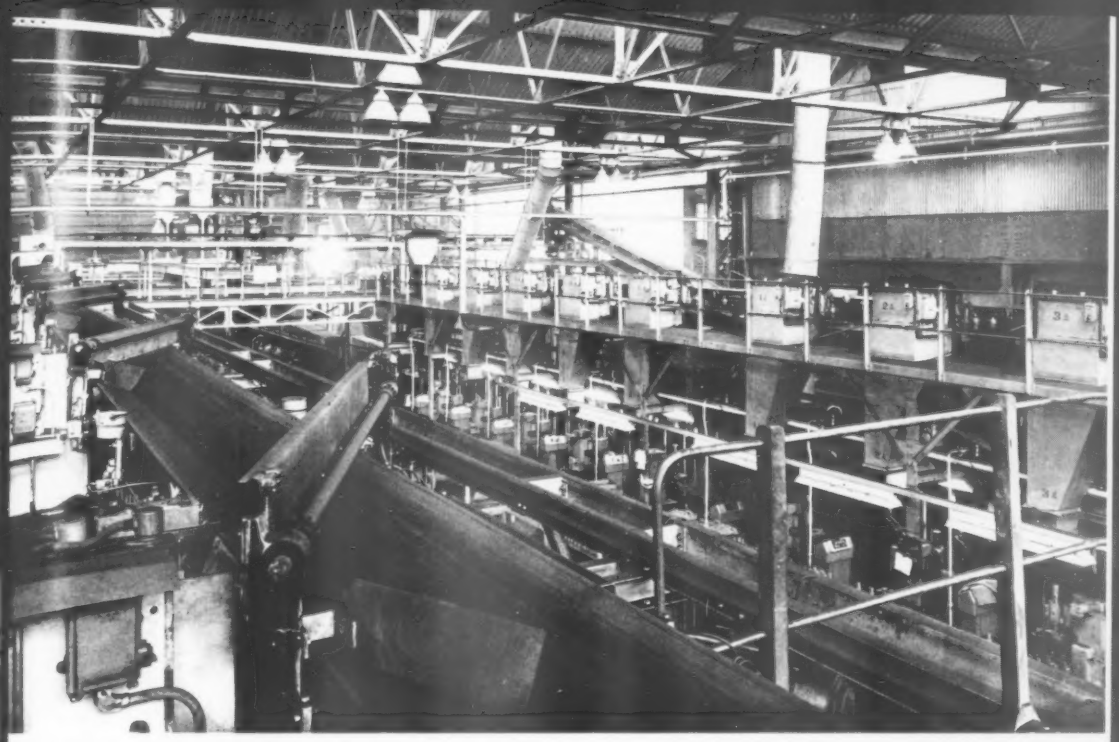
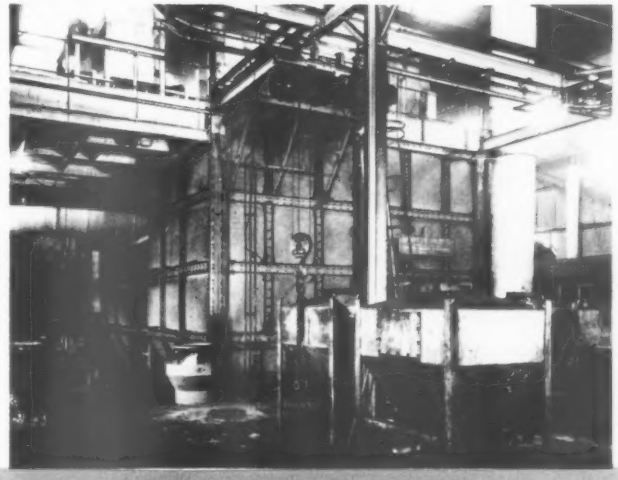


GENERAL VIEW OF SAND HANDLING AND DISTRIBUTION SYSTEM SHOWING TWIN OVERHEAD CONVEYORS FITTED WITH AUTOMATIC AND ELECTRONIC PLOUGH SYSTEM—ELIMINATING *"THE MAN OVERHEAD"*.



VIEW OF PART OF TWIN 125 TON CAPACITY SAND STORAGE HOPPERS EACH FITTED WITH FOUR 36" WIDE 13'3" CENTRES FEEDER BELTS FOR CONTROLLED SAND FEED TO MILLS

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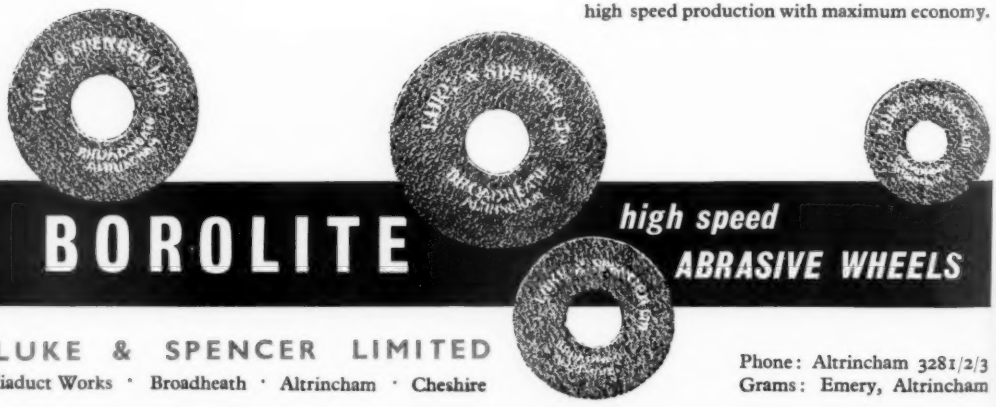

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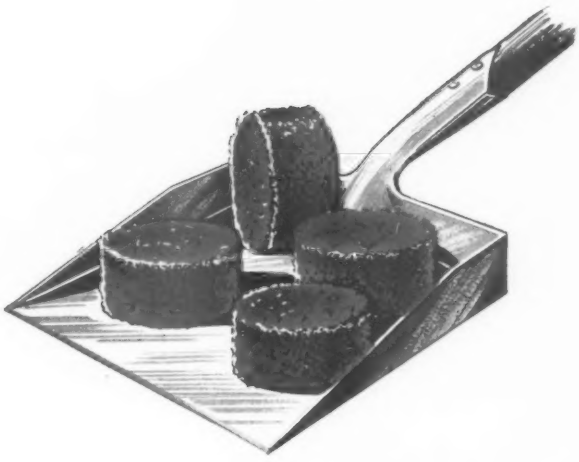

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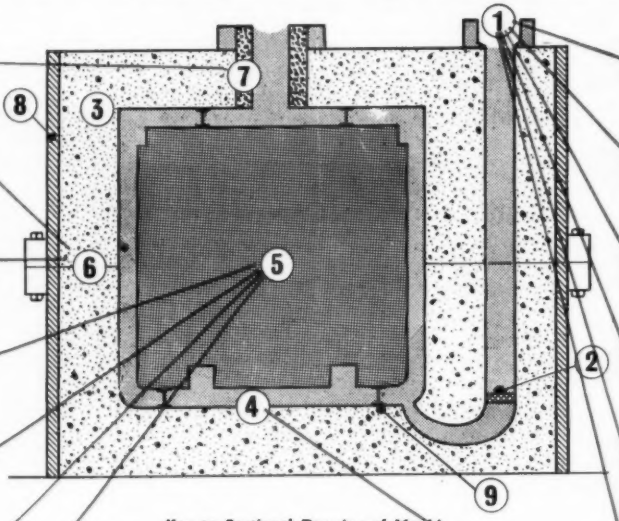

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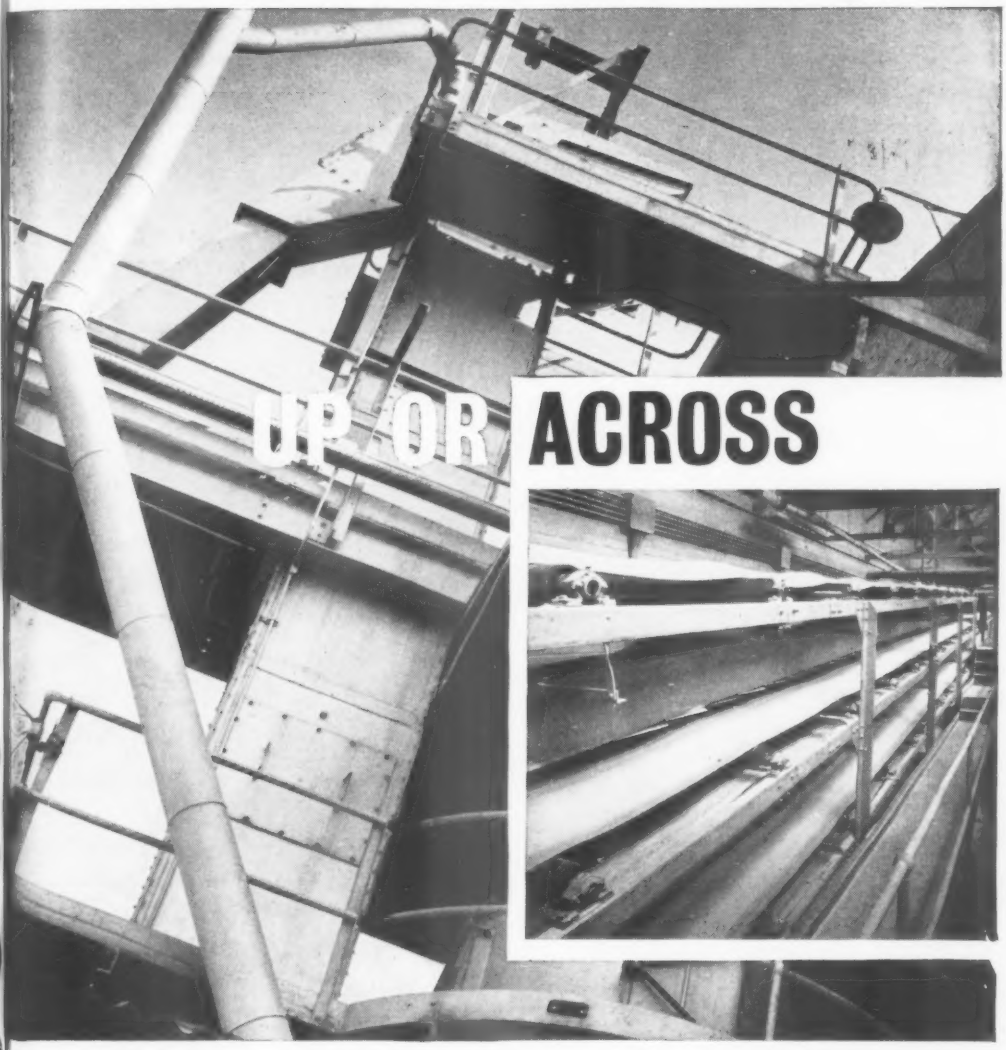

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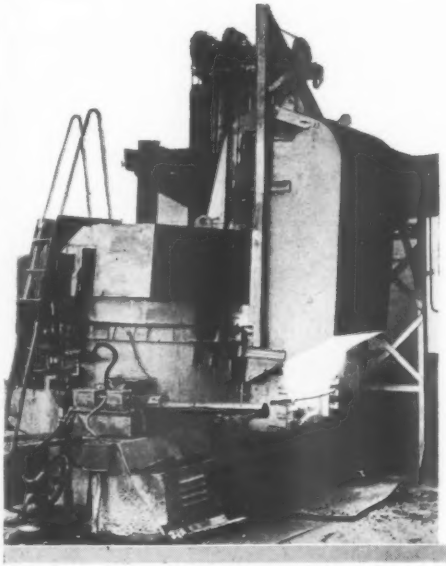

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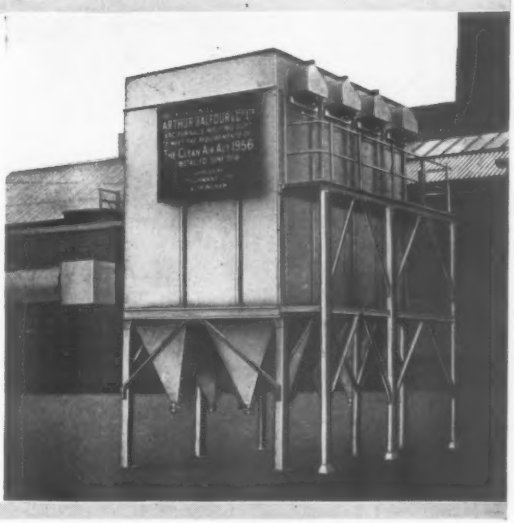

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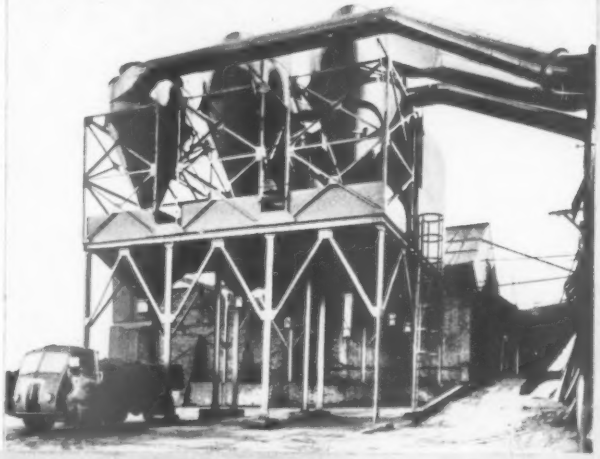

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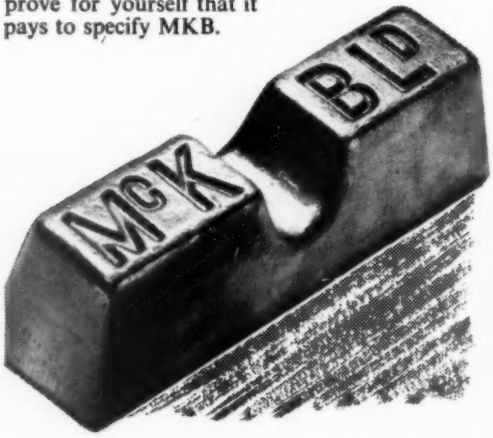

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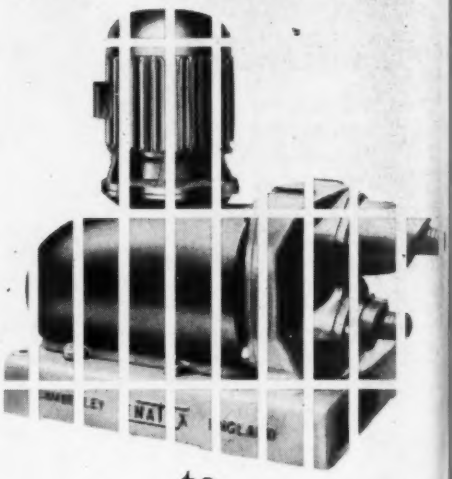

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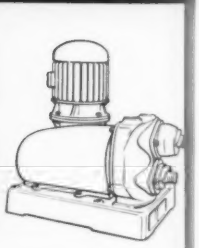

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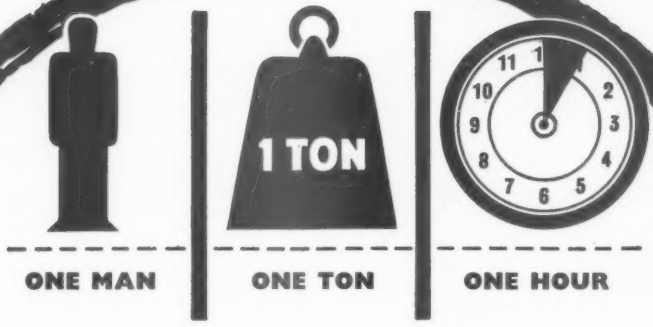

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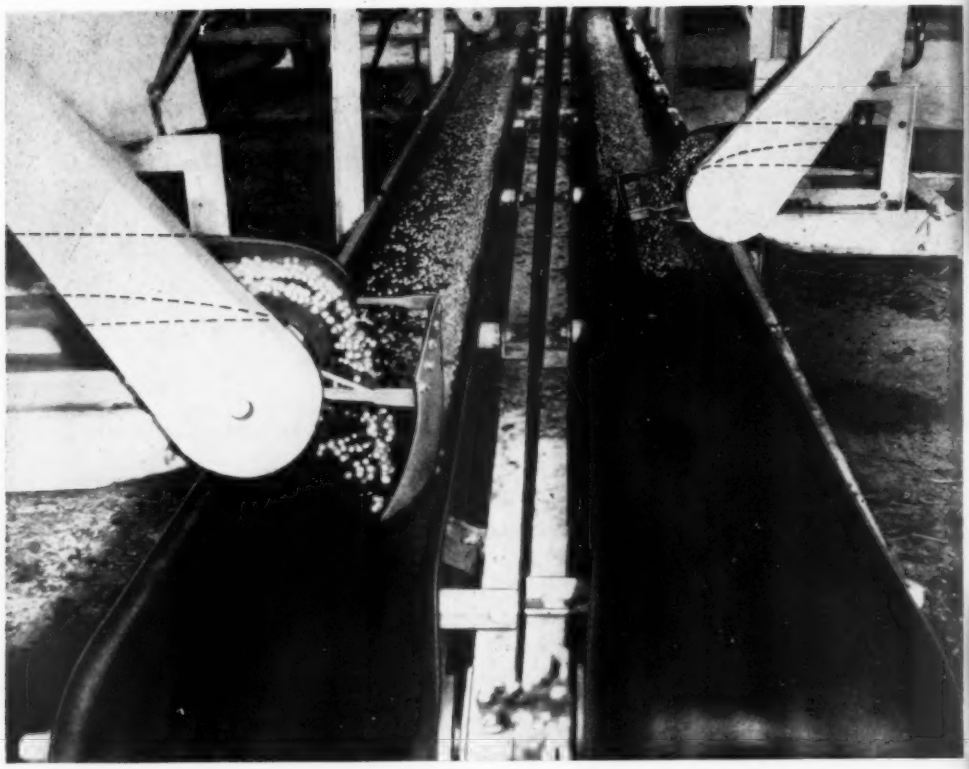

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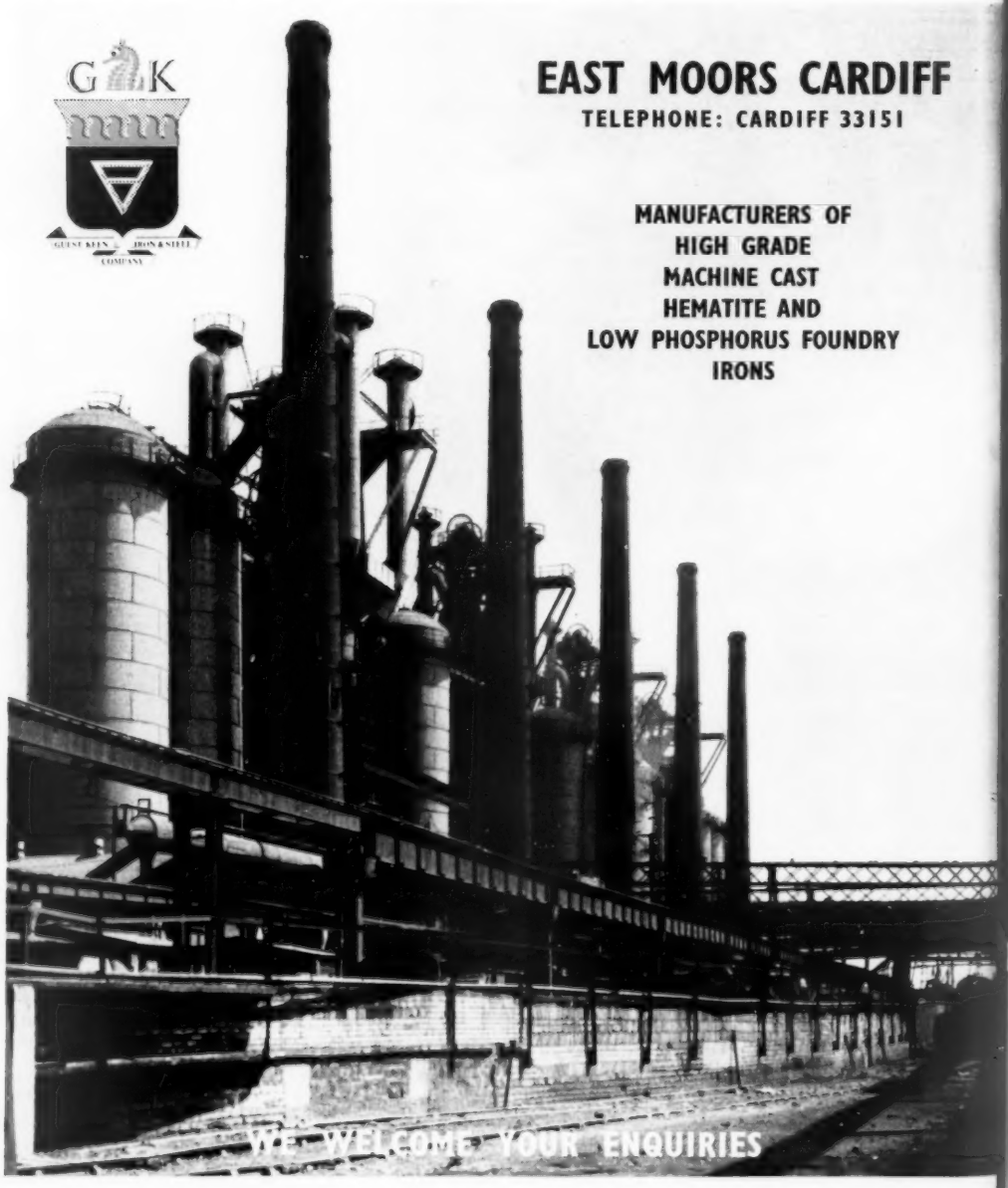

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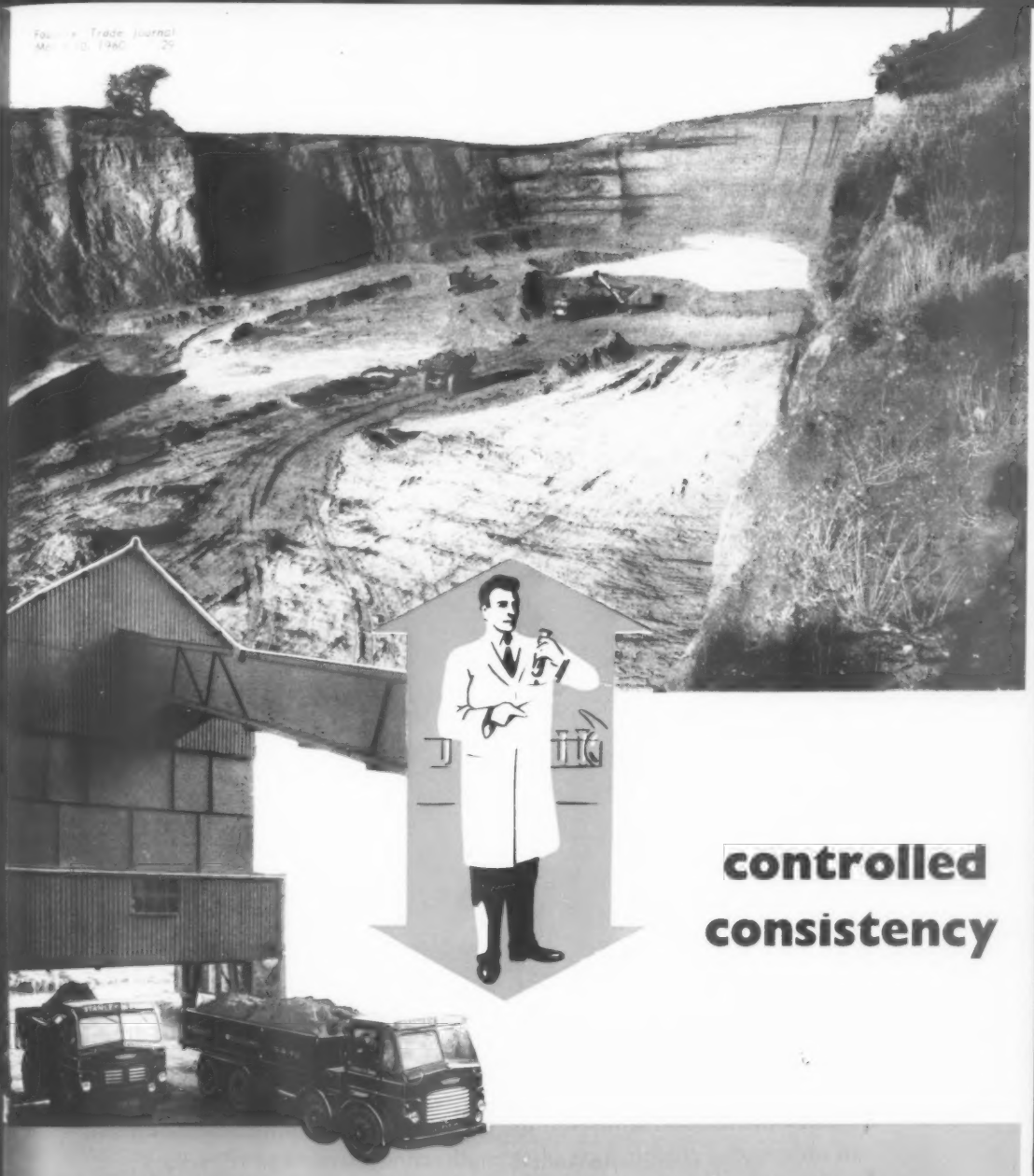

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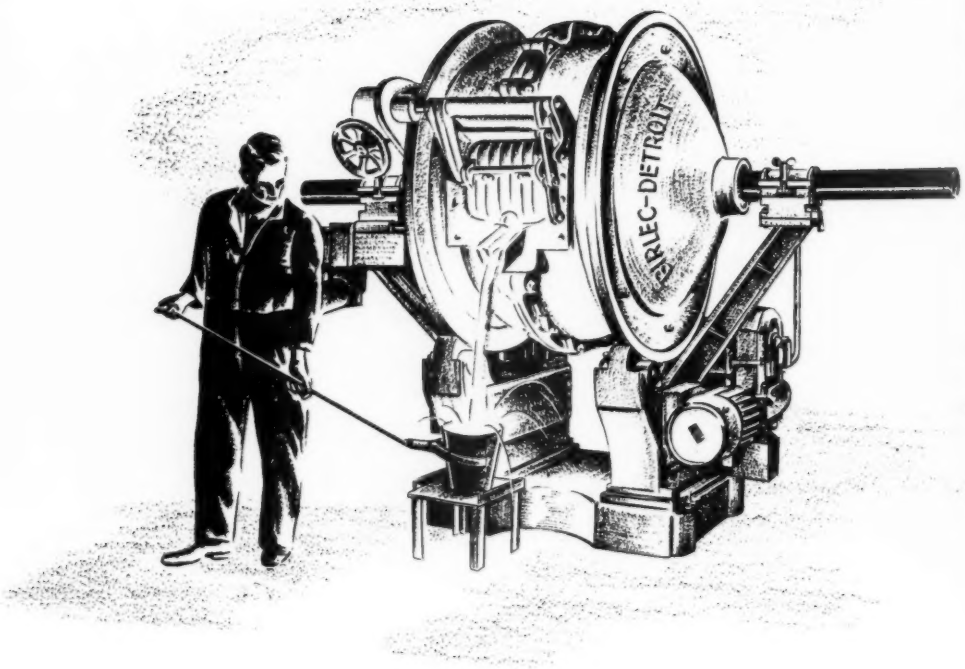

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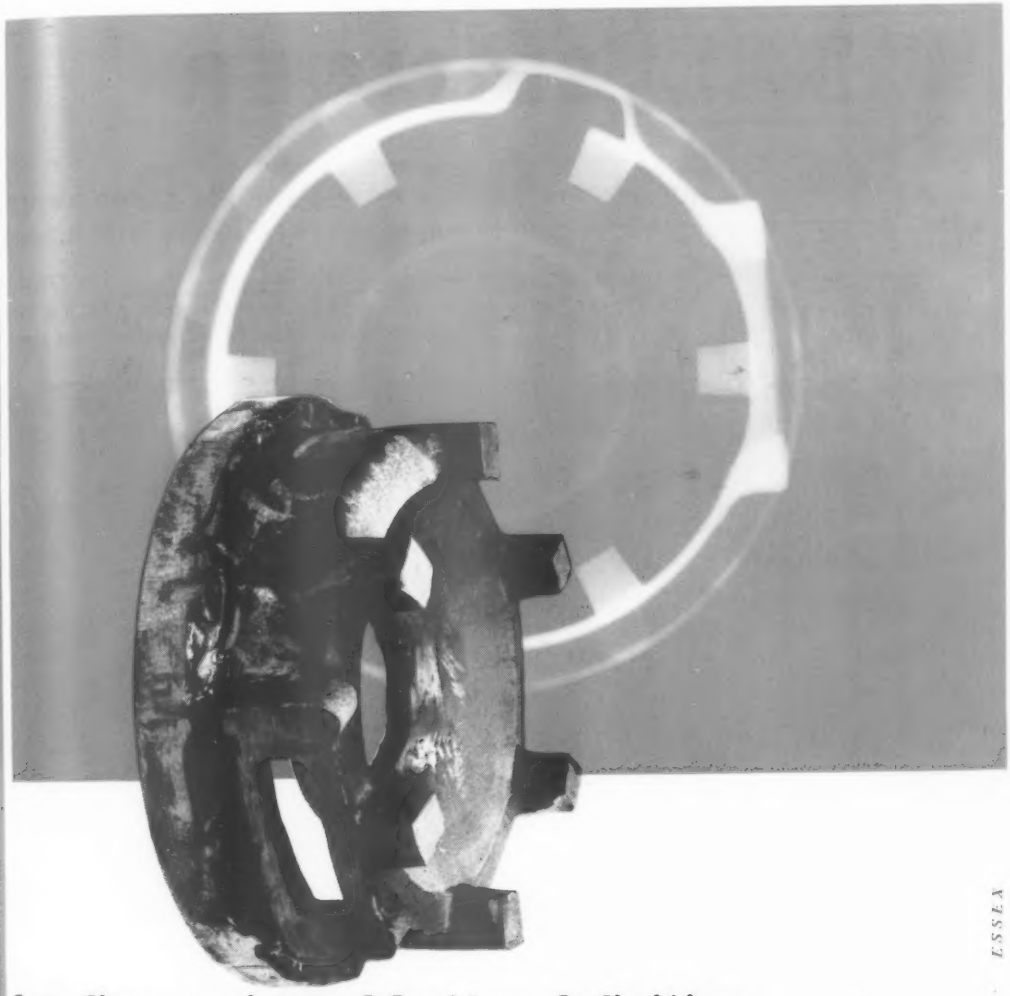

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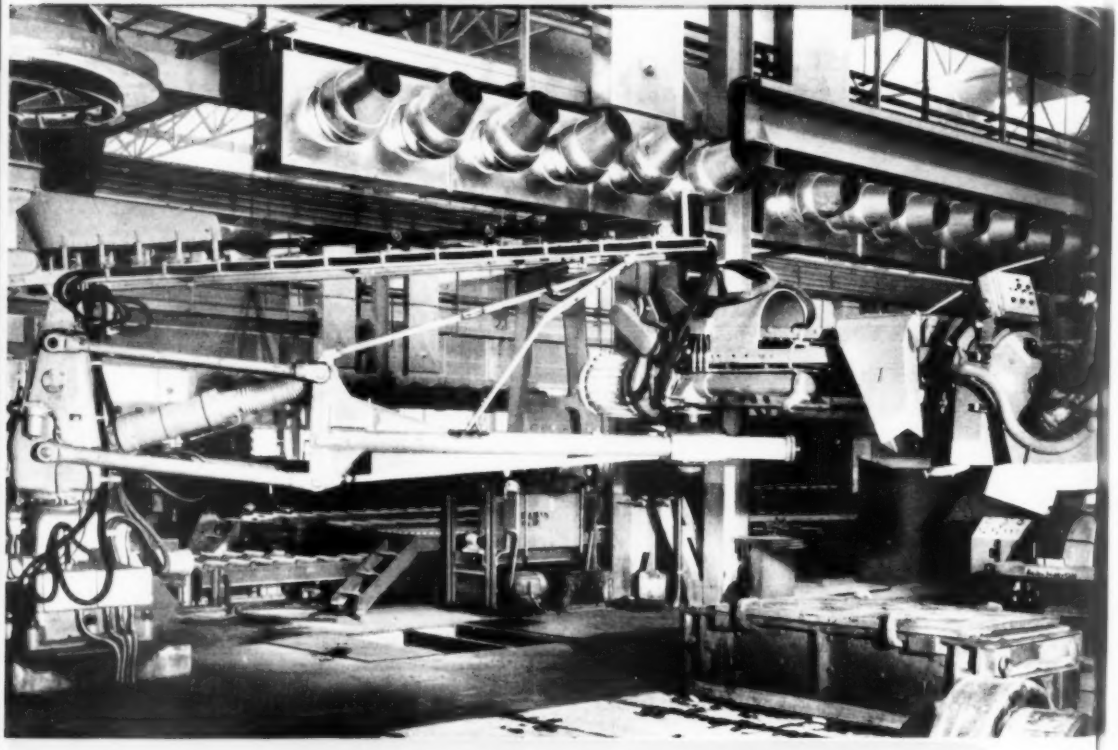

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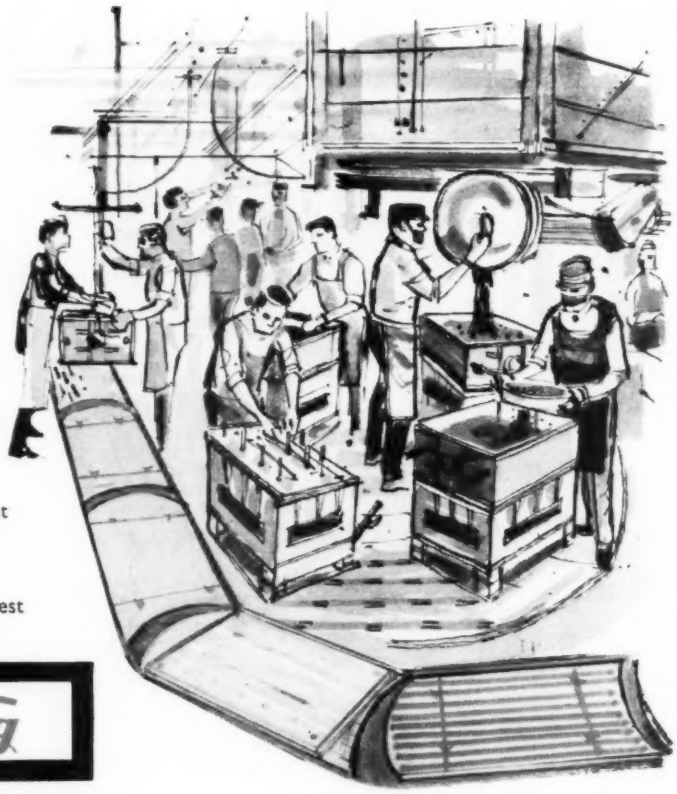

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FOUNDRY TRADE JOURNAL

Vol. 108. March 10, 1960 No. 2257

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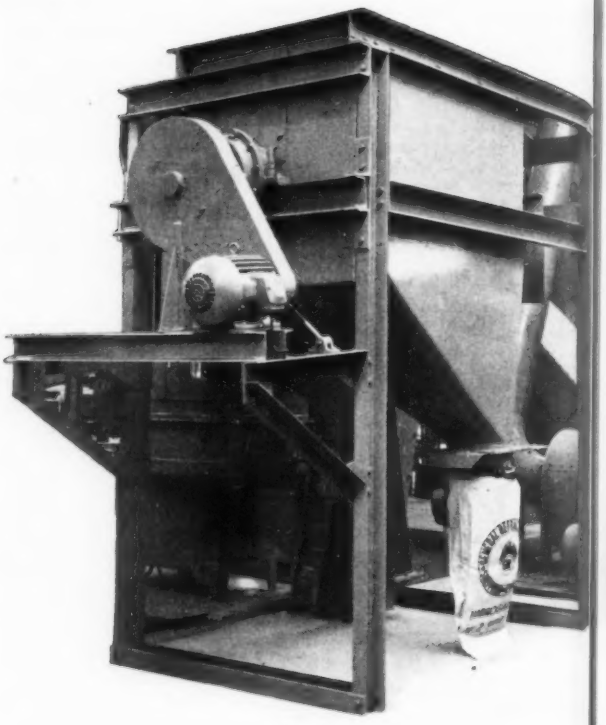
SHELL MOULDING

SAND Precoating Plant



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FOUNDRY
TRADE JOURNAL

Vol. 108 March 10, 1960 No. 2257

National Foundry College

As recently announced in this JOURNAL,* the Board of Governors of the National Foundry College have decided to institute a three-year Sandwich Course for foundry technologists. Students completing the course to the satisfaction of the examiners will be awarded the Advanced Diploma of the College. The content of the course is virtually that established by Dr. J. G. Pearce, C.B.E., when he established the College before the war, but it has been modernized to keep pace with present-day developments. Then, as now, a background of industrial experience was combined with tuition at the College in the more academic aspects of foundry technology. Thus, the institution of a Sandwich Course is in essence a more convenient method of the allocation of time available. In our opinion, for the UK-based students, the new scheme will in time largely replace full-time College studentships.

At the moment, there is a laudable effort by the Ministry of Education to tidy up the whole of the technical education system of the country, but the set-up—built on tradition—is so complicated that no rapid progress can be anticipated. The status of the Diploma of the College is now, and will in the future be, expressed as a concensus of opinion of those who employ the holders of Diplomas and by the eminence of the positions the ex-students attain or have attained in industry. Thus, whether it be held in equal esteem with a "Dip.Tech." only time will tell, but the College Diploma has the advantage of an earlier start and an established reputation.

In a letter which Sir Frederick Scopes, as chairman of the College Board of Governors, has sent to as many managing directors of foundry concerns as can be conveniently found, their support is requested in three ways: (*a*) by nominating students having the essential qualifications and supporting them during their period of training; (*b*) so to order their activities in the works as to complement their College studies, and (*c*) by submitting to the College problems suitable for solution by the students during their training period. (In short, to establish the closest possible liaison between "town" and "gown.") Finally, Sir Frederick suggests—and we stress the desirability of this—that any queries which foundry directors may have in connection with this new Sandwich Course should be sent to Mr. J. Bamford, B.SC., the head of the College, at Stafford Street, Wolverhampton.

* February 18, 1960 issue, page 207.

Correspondence

STEEL CASTINGS—A GOOD BUY

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—Your editorial of March 3 under this title conveys a very accurate assessment of the distinctly appreciative atmosphere which pervaded the Customer/Founder Conference at Earls Court, last week. I feel qualified to comment, because I was one of the two customers—and the more "notorious" of the two, perhaps!—who, at the 1953 Convention, were asked to say frankly what they thought of the steelfounders' products.

That—to use your words in quotes—"the adverse criticisms received must have been salutary" to produce such change in "the whole atmosphere," pays great tribute, rather, to the Council and members of the British Steel Founders' Association, in that they have seen to it—in no uncertain manner—that "change" must not only *appear* to be taking place, but also to be *seen* taking place.

Being now retired, I was privileged to receive a personal invitation to last week's Conference, in complete remission (note: remission, not recantation) of my 1953 sins, and I was thus afforded an opportunity to indicate that whatever the steelfounders thought of my "case" in 1953—and all were then very kind and patient with a layman in the difficult art of steelfounding—I had rested my case some little time ago with complete confidence that the steelfounding industry of this country is rapidly reaching a competence second to none.

And so it will be recorded in the *Conference Proceedings* in due course and, meantime, I hope in your JOURNAL.—Yours, etc.,

A. C. ANNIS,
Consultant to Associated Electrical Industries, (Manchester), Limited.

327, Princess Road,
Fallowfield,
Manchester, 14.
March 4, 1960.

Forthcoming Events

MARCH 11

Institute of British Foundrymen

Tees-side branch: Meeting at 7.30 p.m., in the Teesdale Hall, Head Wrightson & Company, Limited, Thornaby-on-Tees. (For details of change in programme apply to branch secretary.)

MARCH 12

Institute of British Foundrymen

Scottish branch: "Manual or Automatic," by R. H. Garner, 2.45 p.m., at the Royal College of Science and Technology, George Street, Glasgow.

Newcastle and district branch: Meeting at 6 p.m., in the Nevile Hall, Westgate Road, Newcastle upon Tyne. (For details of change in programme apply to the branch secretary.)

MARCH 16

Institute of British Foundrymen

North East Lancashire section:—"Pattern Costs," by J. J. Harvey, 7.30 p.m., at the Accrington College of Further Education, Sandy Lane, Accrington.

Institution of Production Engineers

Birmingham section:—"Recent Impressions of the Soviet Union," by Dr. D. F. Galloway, 7 p.m., at the Midland Hotel, Birmingham.

Institute of Fuel

Yorkshire section:—"Fuel Technology and the Future," by Prof. M. W. Thring, 2.30 p.m., at the Royal Victoria Hotel, Sheffield.

MARCH 17

Institute of Vitreous Enamellers

Northern section:—"Corrosion Resistance of Vitreous Enamel for Domestic Appliances," by N. S. C. Millar, 7.30 p.m., at the Old Nags Head, Deansgate, Manchester.

Midland section:—Annual general meeting followed by "Possibilities of Direct-process Enamelling on Sheet Steel," by S. E. A. Ryder, 7.30 p.m., at the Birmingham Exchange and Engineering Centre.

Institute of Metals

London local section:—Annual dinner 7 for 7.30 p.m., at the Horse Shoe Hotel, Tottenham Court Road, W.1.

MARCH 19

Institute of British Foundrymen

Bristol and West of England branch:—Annual dinner, 7 p.m., at the Royal Hotel, Bristol.

East Midlands branch:—Meeting 6 p.m., at the College of Commerce and Technology, Leicester. (Details of a change in programme may be obtained from the branch secretary.)

Stoke-on-Trent section:—Works visit to F. H. Lloyd & Company, Limited, Wednesbury.

Institution of Production Engineers

Nottingham section:—Works visit to College of Aeronautics, Cranfield, Bletchley, Bucks.

Institute of Vitreous Enamellers

Northern section:—Annual general meeting and social at the Old Nag's Head, Jackson's Row, Manchester.

Honour for N. P. Newman

Mr. N. P. Newman, president of the Joint Iron Council, caught by the camera at Buckingham Palace on the day of his investiture by Queen Elizabeth, the Queen Mother, with the C.B.E. Seen with him are Mrs. Newman and his mother.

South Africa's Newest Steel Foundry*

Developments at Scaw Metals, Limited, Germiston, South Africa, coupled with technical-aid agreements entered into by that firm with the General Steel Castings Corporation of Granite City, Illinois, USA, and English Steel Castings Corporation, Limited, of Sheffield, England, have led to the erection and establishment of what may well be one of the most modern steel foundries in the Southern Hemisphere. A detailed description of the foundry at the new works is given in what follows.

In 1957, Mr. Eric Dreyer (now engineering director) visited the USA, Britain and Europe on behalf of Scaw Metals, Limited, of Germiston, South Africa, to study the latest foundry developments and techniques, with particular emphasis on steel-casting production. On his return to the firm, he commenced the planning, design, building and installation of the steel foundry described in what follows. It is important to note that, except for highly-specialized equipment, emphasis was placed at all stages on locally manufactured products. The new foundry (almost a quarter of a mile long) has been built as an extension to the old foundry (see Fig. 1), but is entirely independent of it.

Foundry Layout and General Details

The foundry buildings comprise: a fettling-shop 64 ft. wide by 720 ft. long; a moulding, casting and furnace bay 93 ft. wide by 720 ft. long; a lean-to-roof over the furnace bay 37 ft. wide by 280 ft. long, and the sand-plant and core-shop bay which is 46 ft. wide by 427 ft. long. The height to the eaves varies from 39 ft. at the west end to a maximum of 47 ft. at the east end. These four bays are all adjoining, making an overall width of 240 ft. and an overall length of 720 ft. The fettling and casting bays are designed with gantries running their full lengths, carrying several overhead-electric travelling cranes. For servicing the ingot-casting bay there is a low level gantry of 60-ft. span extending for a length of 240 ft. in the larger bay at the east end, supporting an overhead crane of 5-ton capacity. This reduced span permits passage of the casting ladle from the furnace to the foundry floor. The total weight of structural steelwork involved in the building was approximately 1,200 tons, the area covered being about 143,000 sq. ft.

Overhead Cranes

Of the six cranes installed, five are equipped with micro-mechanisms on the hoist motion to give an average slow speed of 5 ft. per min. and an average full hoisting speed of 23 ft. per min. The cross-traverse and long-travel speeds are standard throughout at 90 and 250 ft. per min. respectively. In the main bay of the foundry, which has a span of 87 ft. crane rail centres, there are one 30-ton and two 20-ton cranes. One of the 20-ton cranes is equipped with a 5-ton auxiliary hoist. On the low level gantry there is one 5-ton crane of 60-ft. span, and in the fettling bay there are two 15-ton cranes also of 60-ft. span.

Sand Plant and Distribution

Fig. 2 is a unique shot in that it shows the beginning, middle and end of all sand operations. The four concrete silos, covered by a steel roof, are 22 ft. dia. with 7-in. thick walls, and are 70 ft. high. New sand is fed by means of bucket elevators into the two furthest from the camera, and the other two store returned sand from the shake-out. The six-sided steel barrel is a core-breaker with a maximum output of 100 tons of sand per hr. In the left foreground are the two final discharge units for dust and fines collected from the core-breaker and shake-out. This material, in the form of sludge, is discharged into four-wheeled trailers for removal and dumping.

Link-belt System

Some indication of the magnitude and complexity of the Link-Belt sand-handling and storage system may be gauged from the following figures. There are 23 conveyor belts with carrying capacities of up to 90 tons of sand per hour, the longest of which is 442 ft. Four bucket elevators raise sand from one level to another, the greatest height being 85 ft. 1 in., to the top of the silos. There are also six vibratory feeders, five belt-feeders, one screen, two screw-feeders, six surge bins with capacities up to 24 tons, and several sand-storage hoppers (the largest of which holds almost 150 tons of sand). Each silo has a capacity of 800 tons. The entire system is controlled by one man operating the panel shown in Fig. 3, which contains 102 push-buttons and 53 indicator lights. This Mimic diagram is designed to give a visual indication and centralized control of the whole sand-plant operational flow. The unit controls, by remote push-button, the combined motor-control and distribution switch-gear, which is of totally-enclosed front-mounted design. From the Mimic diagram, it will be noted that there are four main divisions in the sand flow: (1) Silos to sand mills; (2) moulding sand to foundry; (3) shake-out to silos, and (4) sand-scrubbing system.

Silos to Sand Mills

The conveyor-belt system is interlocked, so that there is always a correct sequence of operations performed. New and old sand is released from the silos through chutes on to Syntron electromagnetic vibrating feeders, which have variable control of

* Abridged version of an account published in *Engineer & Foundryman*.

rate of flow and are capable of feeding up to 50 tons of sand per hr. The Syntrons feed on to conveyor belts travelling in a tunnel underneath the silos—these belts desposit the sand on to another belt inclined at an angle of 22 deg., which delivers it to a single-deck vibrating screen. Before passing on to this screen, tramp iron is removed by means of 18-in. dia. Eriez permanent-magnetic pulleys. After oversize lumps have been discharged, the main body of sand is conveyed by bucket elevator onto a reversible belt. When this belt travels in one direction, the sand is discharged by means of two-way ploughs into bins above the moulding-sand mills—when it runs in the other direction, it discharges into the core-sand mill bins. The four sand-storage bins above the moulding-sand mills have a total capacity of 400 tons, and the total weight of sand stored in the bins for core-sand preparation is 80 tons.

Moulding

Moulding-sand Preparation

All moulding-sands are prepared in two type-80A Speedmullors. The entire process, excepting charging of the bond to the loading hopper, is automatic and the total cycle time for a 1,800-lb. batch is 90 sec. Automatic sequence control of the milling operation consists of a series of electric timers linked to Maxam air-valves, which work at an approximate pressure of 80 lb. per sq. in. The automatic sequence control initiates the various operations as follows: (1) Add water; (2) flush mill; (3) operate used- and new-sand batch-hoppers; (4) bond addition and dispersion; (5) mulling and cooling, and (6) discharge. No further attention is necessary, as the sequence of operations will continue indefinitely until the stop button is depressed. The dust load from this section of the plant is taken care of by a heavy-duty AAF type-N Rotoclone with automatic sludge-ejection. Several tons of dust are collected daily, leaving the sand plant entirely dust free.

Moulding-sand Distribution

On discharge from the mills, the sand is transferred by conveyor belts as required to the three main moulding-stations (see Fig. 4). The decision as to where the sand is delivered is determined by electrical signals recorded on the Mimic diagram. These signals are transmitted automatically from high- and low-level indicators situated in the sand bins at the stationary or mobile sand-slinger in the new foundry, and at the jolt-machine station in the old foundry. The entire belt-conveyor system is interlocked, so that a definite sequence must be followed. Provision is made whereby, should the sand mixture be incorrect, it can be ploughed off on to the main returned-sand conveyor-belt to be ultimately deposited in one of the silos.

Core-sand Preparation and Distribution

A BMD coresand mixer is installed in the coreshop for the preparation of synthetic and CO_2 sands. This unit has a 4½-cub. ft. capacity and a total output of 10 tons per hr. Duplex gates are fitted under each of the four storage hoppers, and each hopper discharges into a specially designed Avery travelling-hopper scale with a capacity of 1,000 lb. The coresand is fed through the mill discharge door into a portable drop-bottom bucket. The load is then transported on to an overhead platform (shown on the right-hand side of Fig. 5) to be deposited through grids into the coremakers' storage-hoppers.

Coremaking

For various reasons, one of which was the lie of the land, the

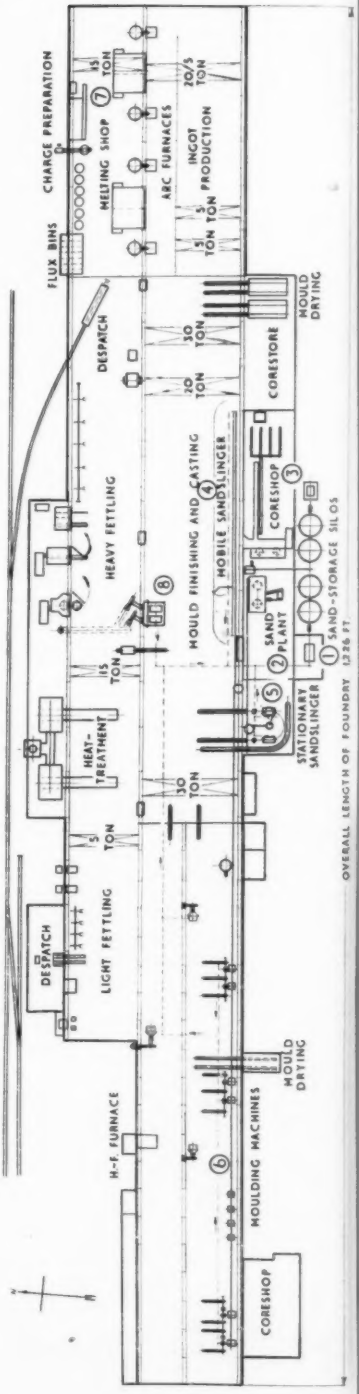


FIG. 1.—*Plan of the old and new foundries at the new Scaw Metals works. The figures in circles indicate locations which are illustrated elsewhere in the article (see appropriate captions).*

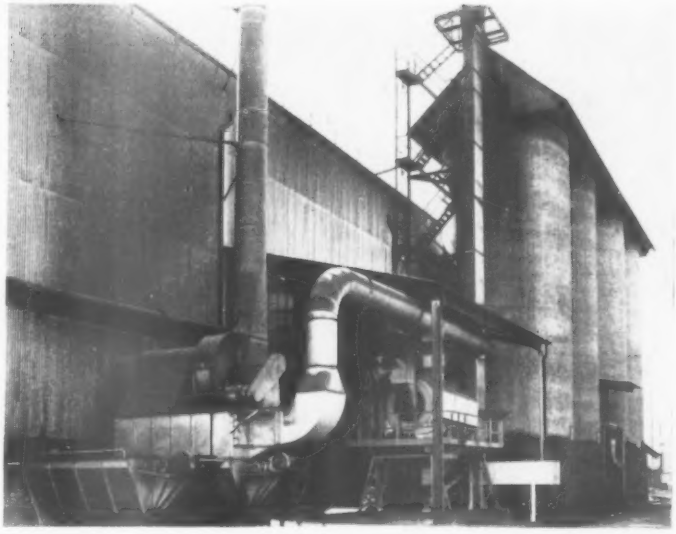
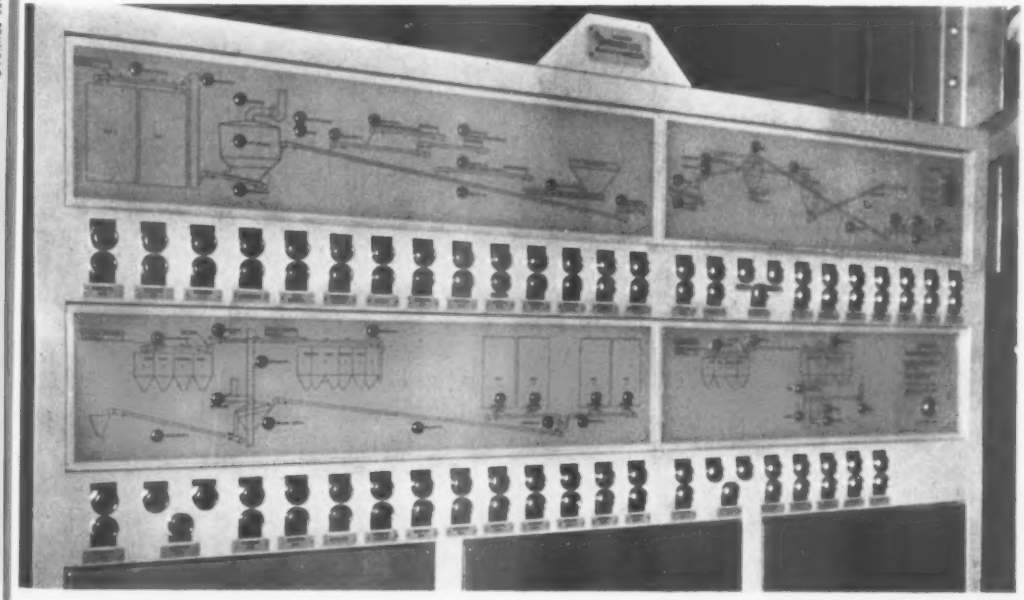


FIG. 2.—*Sludge-ejection unit, core breaker and four concrete silos positioned outside the Scaw Metals steelfoundry (see* (1) *in Fig.* 1).

coreshop is on a lower level than the foundry. Hand- and machine-made cores are produced, using oil-sand, green-sand and CO_2 mixtures. Overhead hoppers, each containing 500 lb. of sand, serve two coremakers each. They are designed on a continuous supply system similar to a chicken-feed bin—as the coremakers draw from the hopper, so fresh sand is made available. Automatic core production is carried out on two Roëper coreshooters with capacities of 12 and 25 litres respectively. A Roëper roll-over core-stripping machine is also installed in the coreshop for handling heavy boxes.

All cores are baked in an " Incandescent " tower oven, which is heated by producer gas. Stand-by oil-burners are fitted, which take over in the event of a failure in the gas supply. The oven is fitted with a flame-failure safety-device, and automatic temperature control currently operating at 460 deg. C. It is over 50 ft. high, has a capacity of up to 2,400 lb. of cores per hr., and a variable drying-cycle ranging from 50 to 150 min. Rapid drying at even temperature is ensured by high-capacity positive-pressure centrifugal-recirculating atmosphere-fans. In spite of its size, the oven can be brought

FIG. 3.—*Mimic diagram for the central control of all operations of the Scaw Metals sand plant (see location number* (2) *in Fig.* 1).



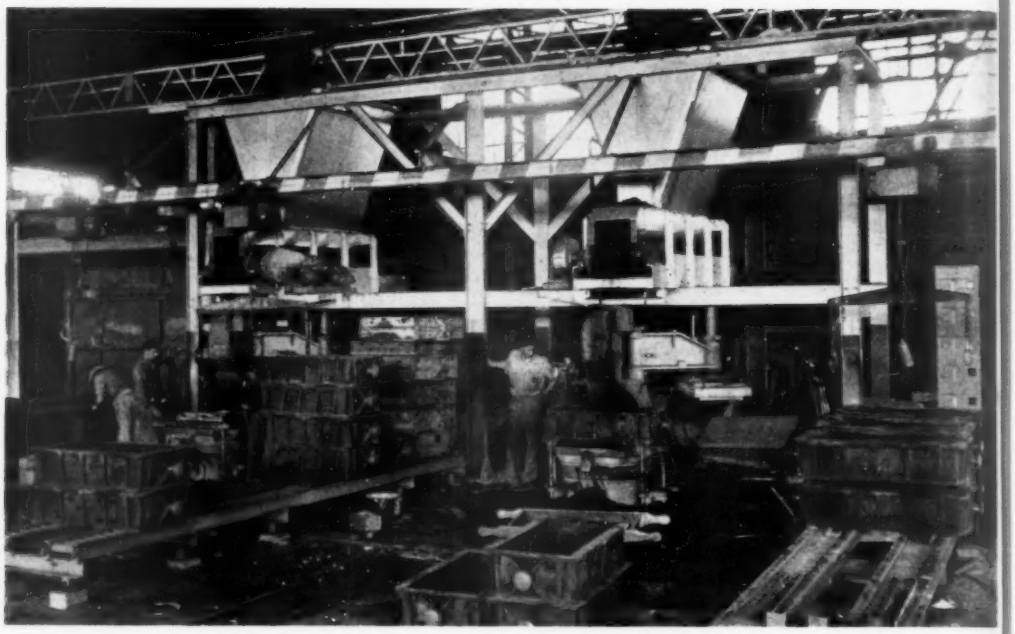


FIG. 4.—*One of the moulding-machine stations in the old Scaw Metals foundry* (*see* (6) *in Fig.* 1).

up to temperature in 30 min. from cold. An exhaust system is incorporated to expel volatiles. The cores are manually loaded at the core-shop side of the oven and off-loaded at the higher level on the foundry-floor side, where they are stored in racks or delivered direct to the closing bay.

Impeller Ramming

All moulding in the new foundry is catered for by two Badische Machine Fabriek sand-slingers, one mobile (Fig. 6) and one stationary (Fig. 7)—apart from mobility, the two machines are identical. The flow of sand is determined by the slinger operator, who is in contact with the sand plant by remote-control signals. He also operates a control for the ploughs on the conveyor-belt which feeds sand to the machine. The slingers are controlled by an operator seated in front of the rammer head—control of the head is effected by a single lever, the direction in which this is moved determining the direction in which the head moves. This ramming head is hydraulically operated, and inclinable to operate through a total radius of 60 deg., which ensures adequate packing of the sand under box bars and in awkward pockets.

The impeller-wheel casing is of welded construction, and contains reversible throwing-plates and two cups. A two-speed 100-h.p. motor provides an impeller speed of rotation of 1,500 or 1,000 r.p.m. Sand is delivered at approximate speeds of 150 and 100 ft. per sec., or the equivalent of a maximum ramming capacity of 1 ton per min. All movements of the machine are hydraulically controlled, and a special device is incorporated to actuate the swinging movement so that the response to the operator is immediate. The total arm length is 19 ft. 3 in., and the arm can be lowered to 4 ft. off the ground level or raised to 8 ft. above ground level. The machine is equipped with an emergency switch which can instantaneously cut off the power to all units.

Tramp-iron Removal

Two 18-in. suspension extraction magnets are in use above the sand conveyor-belts, for the final removal of any metallic particles before the prepared sand is delivered to the two sand-slingers. The magnets are connected to the slingers in such a way that the machines cannot be operated unless the magnet is on.

Mobile Slinger

The mobile slinger is used for heavy moulds, servicing the foundry floor on a track 200 ft. long. The unique feature about the sand supply to this machine is that, as the machine travels on its rails along the wall, its tripper mechanism ploughs off sand continuously from the wall-mounted conveyor-belt, and feeds through a system of belts into the slinger head. Sand is fed to the overhead belt from a surge bin and rotary table-feeder controlled by the slinger operator. The sand is fed to the slinger at a rate of 60 tons per hr. When the slinger stops operating, the slinger-arm plough on the conveyor-belt is raised and the

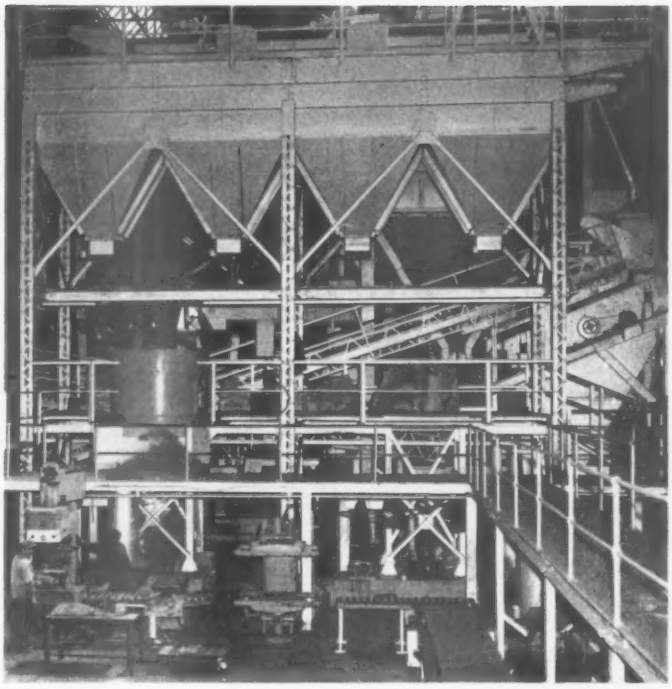


FIG. 5.—*View of the coreshop (see* (3) *in Fig.* 1), *showing the mixer and overhead hoppers, and (lower foreground) the core-shooter and stripping machine.*

excess sand travels on to a discharge point for return to the used-sand storage. Similarly, eight grids alongside the slinger track permit the spillage to fall on to a conveyor-belt in a tunnel under the floor, for return to the silos.

Stationary Slinger

The stationary slinger is used for medium-sized moulds. The sand for this slinger is stored in a 17-ton surge bin, and when required is fed to the machine *via* a rotary table-feeder on a 60-ton per hr. conveyor-belt. Two pneumatically-operated BMD four-pin lift tables are used in conjunction with this stationary slinger. As one mould is being rammed, the mould from the other table is being removed and the pattern and box prepared for the next operation. A small coremaking division works in conjunction with this moulding set-up, two BMM jolt/squeeze machines being used for the making of green-sand cores. The cores are placed in the moulds as they come from the slinger.

Melting and Casting

The melting shop is situated at the east end of the new building. It is arranged to feed both the foundry and ingot-casting bay. The furnace is so placed that tilting is effected from one bay to the other, so that no interference takes place between ladle and furnace-charging cranes.

Furnace

A 10-ton Birlec electric-arc furnace provides for the immediate needs of the new steel foundry and ingot bay. This furnace has a rating of 4,000 kva., and is provided with three 10-in. dia. graphite electrodes. This electrode size is somewhat smaller than that previously used for furnaces on this rating. One of the reasons for this reduction in dia. is the fact that electrode consumption is to a great extent caused by oxidation, and, as this is very much a function of surface area, there is a trend towards using smaller-dia. electrodes to reduce consumption.

Electrode movement is under automatic control

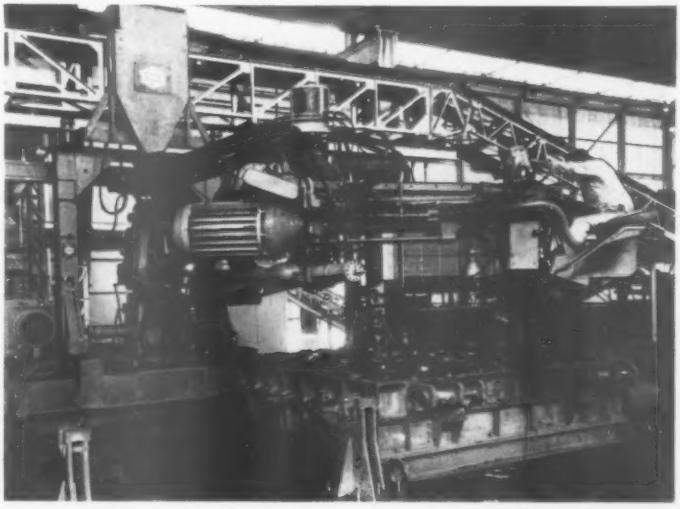


FIG. 6.—*Mobile sand-slinger in operation in the new foundry (see* (4) *in Fig.* 1).

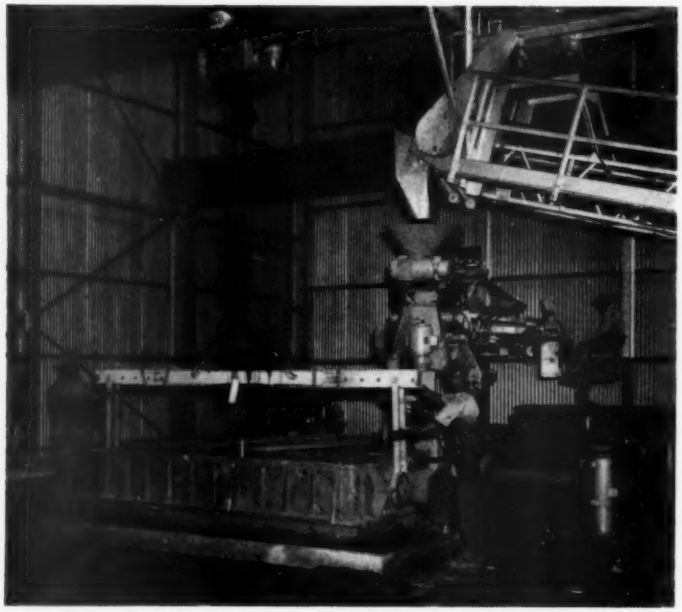


FIG. 7.—*Stationary sand-slinger used for the medium-sized moulds (see (5) in Fig. 1).*

throughout the whole of the melting and refining periods, the regulator for this being a Birlec-British Thomson Houston Amplidyne unit. The advantages claimed for this method are great flexibility of operation, and complete ability to deal with all furnace conditions. The Amplidyne regulator system requires no adjustment after commissioning, and practically no maintenance, as there are no contactors continually in operation (as was the case with earlier types of regulators).

An unusual feature of the furnace installation is that there are two high-tension switches for controlling the equipment. One is a contactor, which is used for all normal on-and-off switching, and the other is an oil circuit-breaker which protects the whole equipment, including the contactor and main transformer. By means of this system the switching functions are properly divided up between two units, and there is a considerable saving in maintenance costs and time—in fact, it is possible to change the contactor contacts between heats. There is, in addition, a high degree of electrical and hydraulic interlocking throughout the whole installation, so as to increase plant reliability and safety to personnel.

Furnace Charging

An Avery heavy-duty scrap-metal weighbridge, with a capacity of 15 tons, is used for preparing charges. The scrap is loaded into a bogie and positioned on the machine by a magnetic crane. To prevent damage to the weighing mechanism by the severe shock loads, special shock-absorbing features of free-motion suspension have been incorporated in the design. An electric recording-mechanism prints the weight of each load of scrap.

The furnace is of the swing-roof top-charging type, 10-ton capacity charging buckets being used for loading (see Fig. 8).

Fume Extraction

A fume-extraction hood on the electric furnace has been constructed in such a manner that it covers the charging door. For furnace charging, the hood may be swung aside.

Molten-steel Temperature Measurement

Temperature measurement in the furnace is effected by means of a Honeywell Brown high-speed electronic-recorder, and a portable immersion-pyrometer. This pyrometer is a platinum/Pt.-rhodium thermocouple with a temperature range of 800 to 1,760 deg. C. The standard unit has been modified to suit the conditions at Scaw Metals, the main alteration being that the pyrometer enters the bath at an acute angle rather than at the conventional right-angle.

Pouring

Six, 11-ton capacity ladles are used for pouring. The ladle is handled by the 20-ton crane for transfer to the foundry floor, the contents of the ladle being measured by a scale between the crane and ladle hooks.

Dust Control

The far-sighted design work of the Scaw Metals planning staff is demonstrated in the complete dust-control at the sand-conditioning plant and shake-out. All possible health legislative requirements and future air-pollution regulations were taken into consideration when investing in the considerable capital cost of the installation. The American Air Filter engineered exhaust system handles 66,000 cub. ft. per min. for the large side-hood adjacent to the shake-out. This air quantity is exhausted through two AAF type-W Rotoclone dust-collectors, each handling 33,000 cub. ft. per min. The heavy dust load is prevented from polluting the atmosphere by the combined cleaning and fan action of these units, which occupy what is virtually "dead space" under the crane rails.

The dust-laden air passes into the Rotoclone where a conical spray plays on to a turbine-type impeller which, by its special design, not only exhausts the air from the side hood, but also precipitates the dust in the form of a slurry. The collected slurry is pumped to a sludge-settling tank outside the foundry. This process allows of 100-per cent. water recirculation. The cleaned air is discharged into a tunnel running underneath the bay to an

exhaust stack sited to suit the other foundry equipment. There is no visible discharge from the stack, and an extremely high efficiency of dust collection is being obtained.

Shakeout, and Return Sand-flow

After casting, moulds are transported to the two Duplex 6- by 10-ft. Link-Belt shakeouts (see Fig. 9), which have a maximum capacity of 15 tons each. During vibration, the sand falls through the grids into hoppers, which are provided to control the in-flow of sand and prevent any overloading of the underground-return conveyor-belt system. From the hoppers, the sand is discharged on to a heavy-duty high-temperature oscillating conveyor 36 in. wide and 50 ft. 6 in. long, from whence it is fed onto the tail end of a 24-in. conveyor-belt, 143 ft. long, which in turn feeds the core-breaker screen at a rate of 90 tons per hr.

Before the sand enters the core-breaker it passes under a Rapid overband magnetic-separator. This is of the electro-magnetic type, with automatic self-cleaning, driven by a 1½-h.p. motor. From the core-breaker, which has a output of 100 tons per hr., the sand is transported by belt and bucket conveyors to silos number 1 and 2 for storage.

Scrubber System

A National 8-cell sand-scrubber is installed for the reclamation of "used" sand, in an effort to reduce the input of new sand. Sand is drawn from the storage hoppers at the sand-preparation plant and fed into the pneumatic scrubber at a maximum of 6 tons per hr. A turbo-blower provides powerful air-jets which shoot the sand on to a target area. The impact removes the clay particles, which are exhausted from the scrubber, and the scrubbed sand is returned to the storage hoppers by means of a 12-in. dia. screw-feeder and bucket-elevator.

Fettling

Castings are transferred by bogies from the shake-out to the fettling-bay adjacent to the foundry. This department is provided with two Asea 15-ton overhead-cranes, which are concerned mainly with transportation of castings from one point to another. All other handling of castings at the various fettling points is by means of Lasch electric-hoists mounted on jibs fitted to the building columns.

Feeder-head Removal, and Grinding

Runners and feeder-heads are removed by the oxy-acetylene process, but for fettling in general, Thor high-frequency grinders are used. For heavy grinding, there is a battery of Howitzer Mark-2 high-speed swing-frame grinders. Each grinder is powered by a 7.5-h.p., 1,455-r.p.m. 3-phase motor, the grinding wheel being vee-belt driven, and correct peripheral speed obtained by a double-vee pulley. A safety device is built into each grindstone guard which prevents the belt from being placed on the high-speed pulley when the stone is new. The belt can only be placed on the high-speed pulley when the stone has worn to a safe diameter, thus ensuring that the stone can never be run at a dangerous

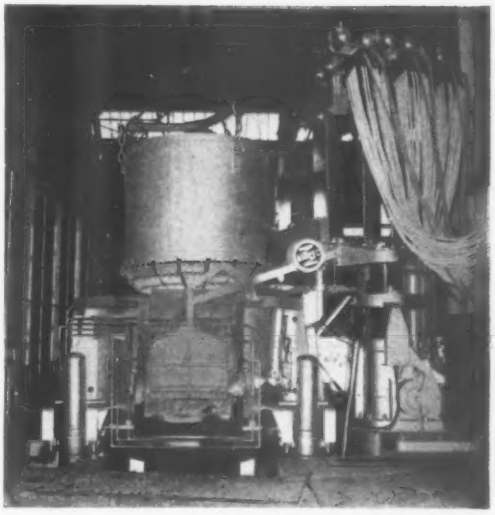


FIG. 8.—*Furnace being charged by a* 10*-ton drop-bottom bucket* (*see* (7) *in Fig.* 1).

FIG. 9.—*Large mould being handled at the shake-out station* (*see* (8) *in Fig.* 1).

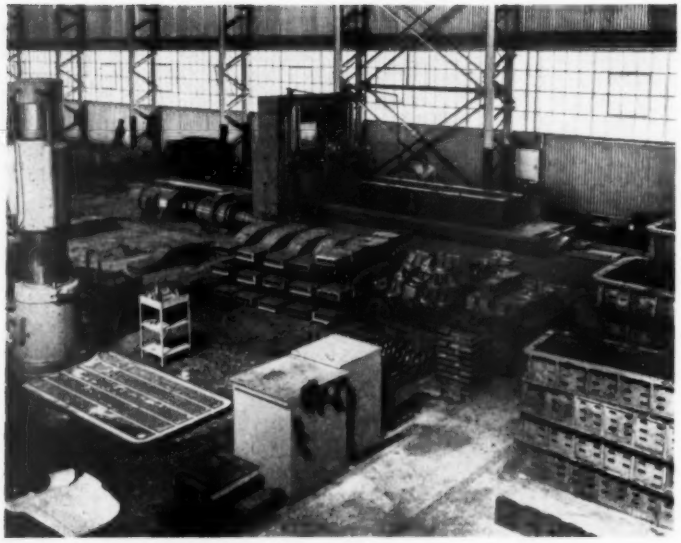


FIG. 10.—*View of part of th Scaw Metals machine-sho showing a selection of castin (note the steel moulding-box o the table planer).*

speed. The peripheral speed of the 20-in. dia. grinding-wheel is 9,350 ft. per min. When the wheel has been reduced to 16-in. dia., the vee-belt is changed to the second vee-pulley, thus enabling the wheel to continue running at the same speed.

Abrasive Cleaning

For cleaning of castings, a Tilghman's swing-type dual-table Wheelabrator is installed. The castings are loaded on to one of the tables, which is then rotated inside the cabinet during the blasting cycle. The other table is loaded with more castings during this period. This plant, type WSTD.9, consists of two 9-ft. dia. tables, the one inside the chamber being driven by friction drive. The tables are moved in and out of the cabinet by hand, with finger-tip control. The plant has two Tilghman's special throwing-wheels, each wheel discharging 350 lb. by abrasive per min. The load capacity of the table is 5,000 lb., the maximum size of casting being 6 by 6 ft. by 26 in. high. The output of this plant is approximately 6 to 7 tons per hr., depending upon the type of castings being cleaned.

The throwing wheels are situated on the roof of the cabinet, and are arranged in such a way that almost complete coverage of the castings is obtained while they are rotated underneath the blast. The plant is fitted with a dust-arrester which removes all dust and foreign matter from the abrasive material after blasting, only clean abrasive being recirculated to the throwing-wheel. A feature of the dust-arrester is an automatic relay which shakes the dust-bags for a given period. This type of machine is capable of operating with any type of metallic abrasive, such as steel shot or cut wire. Satisfactory results are being obtained with grade "C" angular chilled cast-iron grit.

Room Plant

For cleaning castings whic are too large for the swing-typ wheelabrator, an air-bla cabinet 10 by 15 by 8 ft. hig with a ½-in. perforated-pla floor, is installed. A fou wheeled trolley with a loadin capacity of 15 tons transpor the castings on rails into th cabinet. The operator stan inside the cabinet, and blastin is carried out with a ½-in. bor long-life type nozzle using a air-pressure of 80 lb. per sq. in The abrasive and dust fa through the perforated floo and are taken by conveyor-bel and an elevator to a rotar separator and "air wash" for removal of fin dust. The recirculating of the abrasive is auto matic. Tilghman's dust-arrester is also incorpor ated with this plant, and removes all dust from th cabinet, providing clean working conditions insid the cabinet and collecting the exhaust dust in hop pers underneath the collectors. This equipment manufactured in South Africa under licence, to th design of the patentees.

Heat-treatment

Two Wellman gas-fired annealing-furnaces a used for the heat-treatment of castings. Sem clean gas, from a Wellman Galusha producer wit a gasification rate of 2 tons per hr., is employe The effective hearth area of the furnaces is 15 f wide by 18 ft. long, with a clearance of 6 ft. fro the hearth to the springing of the door-heart Each bogie has a loading capacity of 50 tons, an is pulled out of and into the furnaces by mea of a wire rope attached to the hook of the sho crane. The furnaces are designed to raise th charge from cold to 650 or 1,100 deg. C. at the ra of 100 deg. C. per hr. Each unit is equipped wi 10 Wellman Basequip K gas-burners, five per sid which are suitable for operating on low-pressur gas of all types. The air-pressure at the burn is 6 in. w.g., which passes through a series o tangentially-drilled holes, thus causing an intima mixture of gas and air which results in a hig efficiency factor.

The burners are situated at the top of the sid walls, opposing each other and inclined towards th roof, thus preventing any flame impinging on th castings. The products of combustion circulate the furnace and are removed through 16 por (eight each side) in the side walls at hearth leve Each port is individually controlled by means of

refractory damper-tile. The waste gases are collected in two underground flues, one at either side of the furnace, the gases being exhausted by natural draught.

Control Panels

Electroflo meters on the annealing ovens ensure close temperature-control at all stages of heat-treatment, as well as permitting the minimum amount of oxygen to be introduced into the furnace atmosphere. The temperature-recorder controls are of the potentiometric type which operate, through hydraulic regulators, the dampers to control the flow of gas to the furnace. Additionally, a hydraulic ratio-regulator has been provided to maintain the correct gas : air ratio—this unit compares the flow of gas to air supply, so that the air flow is at all times in balance. Facilities are also provided to instantly adjust the air : gas ratio to suit varying fuel- or load-conditions. A programme controller operates the control index of the potentiometric-type temperature-controller, thus ensuring that all operations follow the correct sequence. Lights situated on the panels indicate the progress of the operation.

The temperature is recorded on a strip chart connected to a platinum/Pt.-rhodium thermocouple situated in the roof of the furnace—this is for the general control of heat input. A further six platinum/rhodium thermocouples are situated at various points in the furnace, in order that equal temperature conditions may apply and be checked and recorded in all zones. The furnace pressure is also controlled by a regulator which continuously adjusts the gas-outlet damper, the furnace-pressure tapping being taken from the roof of the furnace in order to maintain constant conditions in the furnace and prolong the life of the refractories.

Inspection

Casting-straightening Press

A 500-ton casting-straightening press, with a ram stroke of 12 in., is installed in the inspection department, the table size being 12 by 12 ft. The cylinder is adjustable along the length of the crown in order to allow application of the force at points to be straightened. The crown is also adjustable for height. In order that the machine can be controlled from any point, operation is by means of a push-button pendant control.

Rigid inspection is maintained over all castings, a selection from which is shown in Fig. 10, and special jigs are provided for the main production lines. A 2,000-lb. weighbridge, with a platform of 8 by 4 ft., is used for weighing the finished castings prior to despatch.

RENOLD CHAINS, LIMITED—Mr. Rex Bate has been appointed a director.

WOLVERHAMPTON METAL COMPANY, LIMITED—Mr. J. H. Furnical has been appointed chairman and will relinquish his office as joint managing director on March 31. Mr. J. Pilkington has been appointed a director.

Zircon Wash for Dry-sand Moulds*

Set out below is a formulation for zircon wash which has been widely used in a steelfoundry and given general satisfaction as a refractory coating. (Some founders, after testing it, slightly modify the proportion of certain constituents to suit local conditions.)

	Parts by weight
Zircon flour (90 per cent. of particle-size below 40 microns (*i.e.*, passing a 270-mesh AFS sieve))	1,000
Colloidal clay	40
Linseed oil	50
Water (according to the fineness of the zircon flour)	350 to 500

Method of Preparation

The method described is for a typical application of zircon, the bond of the wash being a mixture of linseed oil and colloidal clay, with water as the suspension agent (linseed oil being insoluble). If the quantity of water decided upon is 350 parts, then the following operations are suggested: (1) Prepare a gel by mixing the colloidal clay with 300 parts of water (the clay is poured in a regular stream bit by bit into vigorously stirred water); (2) add the zircon flour to the gel, and (3) add an emulsion of the linseed oil in the remaining 50 parts of water. An apparatus of the mixer/ aerator type is recommended for these three operations. If this is not available, a portable electric drill can be adapted in a suitable manner. Alternatively, a type of mixer used by the paint trade serves adequately. A wash so prepared has the appearance of a whipped cream, is totally devoid of lumps, and can be applied with a spray-gun (high pressure).

Precautions in Use

The wash should be fairly thick, that is to say it should carry a minimum quantity of water so as on the one hand to ensure a good "hold" in suspension and, on the other, avoid the incidence of veining on the mould surface after stoving—excess moisture is often a cause of this. Moreover, the thickness of the wash applied should properly cover the surface, without yet being too thick, because this can cause cracking during stoving. A moderate stoving temperature—about 250 deg. C.—is recommended, associated with slow cooling in the oven.

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* Translated from the *Journal d'Informations Techniques des Industries de la Fonderie.*

WOODFIELD PICKERING, LIMITED—Sir Stephen Gibson has joined the board as chairman. The company was formed last September to provide complete offshore oil-drilling equipment for companies engaged in prospecting undersea sources of oil supply. It is a partnership of Woodfield (Rochester), Limited, and R. Y. Pickering & Company, Limited, Wishaw (Lanarkshire), members of the Lithgow group of shipbuilding and engineering concerns.

Foundry Trades' Equipment and Supplies Association

Annual Dinner in London, March 2

About 200 members and guests attended the annual dinner of the Foundry Trades' Equipment and Supplies Association last Wednesday in the Connaught Rooms, London. The president of the Association, Mr. Gavin C. Paterson, B.SC., was in the chair, supported at the top table by Mr. John Rodgers, M.P. (Parliamentary Secretary to the Board of Trade); Mr. C. H. Wilson (president, Institute of British Foundrymen); Mr. V. C. Faulkner; Mr. W. E. Aske; Mr. M. J. Glenny (chairman, Council of Ironfoundry Associations); Dr. C. J. Dadswell (chairman, British Steel Founders' Association); Mr. E C. Rowen (vice-president, National Society of Master Patternmakers); Mr. W. Rawlinson; Mr. C. Orton Foster; Mr. A. J. N. Brown (president, Association of Bronze & Brass Founders); Mr. R. Barber (director, British Steel Founders' Association); Mr. A. C. Jennings, M.A. (Master, Worshipful Company of Founders); Mr. J. Bain, A.M.I.MECH.E. (president, London branch, Institute of British Foundrymen); Mr. R. Sutcliffe; Mr. G. Lambert (secretary, Institute of British Foundrymen); Mr. R. B. Templeton; Mr. R. W. Stote; Mr. D. C. Paterson; and Mr. K. Marshall (director, Joint Iron Council).

Major Importance of Exports

At speech time, the toast of "The Association" was proposed by Mr. John Rodgers, who began by stressing the high status that the FTE&SA occupied and how widespread and important to-day were the products of its members, mentioning in addition that he understood nowadays over one-fifth of the industry's production was exported. He went on to elaborate the importance of exports in this country's overall economic scheme, saying that it must be shown that the UK system of free enterprise can help the under-developed countries of the world. The main problem, he said, was economic, in that exports must pay for imports. They were the basis of the increased living standards here and this country's industry must also provide investment funds for overseas development. In the UK, we depended on exports more than any other country, hence the importance of breaking down all barriers so as to produce good prospects for trading and do proper justice to our country's potentialities. The Government had tried to implement this policy in a variety of ways: through the GATT (the General Agreement on Tariffs and Trade, which has 37 countries as members) in the reduction of tariffs; through the International Monetary Fund (with 68 members), towards ever greater freedom of exchanges, and through the Organization for European Economic Co-operation (with 17 West European members) towards the elimination of import licensing and other barriers to trade and payments.

Still more co-operation between countries was needed and thus the Government had welcomed the idea of the formation of a European Common Market. When this did not come about, the UK joined in the "Outer Seven" group as a compromise which offered a potential in the future for further liaison with the "Inner Six" countries. Meanwhile, Mr. Rodgers commended the countries represented among the Outer Seven as markets open to Association members.

Badge of Office

At this stage, Mr. Rodgers decorated the president with a medal and ribbon of office, which had been newly subscribed for by the Association. He then concluded with the formal proposition of the toast which was then honoured.

Beginning his remarks in reply, the president, Mr. Paterson, said, jocularly, that now he was "properly dressed," he could thank Mr. Rodgers and express his pride at being the first to wear the presidential insignia.

He mentioned that in the last two years, Association membership had increased from 70 to 90 firms and stated that this increase in membership could be regarded as a measure of success. Last year's exhibition, too, which had been embarked upon with some trepidation had also turned out most successfully, mainly due to the enthusiasm of all who participated. He drew the attention of Mr. Rodgers to the value of such small specialized exhibitions, located in the centre of the industry involved. The next foundry exhibition, Mr. Paterson went on, would be similar to that at Bingley Hall, *i.e.* there would be no joint participation with any other organizations. It would be held in 1963, in Birmingham, but unfortunately no assurance could be given that that city's new exhibition hall would be ready in time and Bingley Hall might have to be used again. (Here, he asked if Mr. Rodgers could bring any influence to bear so that the new exhibition accommodation and other correlated facilities could be pushed forward.) Finally, after referring briefly to the somewhat unfair competition from countries whose Governments sponsored extended credit-schemes and touching also on the great indirect exports of UK founders—many of whom were among the guests—Mr. Paterson concluded his acknowledgment of the toast.

After an interval for light entertainment, Mr. J. P. Jones, managing director of W. J. Hooker, Limited, had the difficult task—which he did very well—of proposing the toast of "The Guests." He mentioned several of the principal ones by name and stressed how their activities were inter-related with those of the Association and how pleasant it was to meet them outside the line of business. The response to this toast was made by Mr. R. B. Templeton, M.I.MECH.E. (past-president, Institute of British Foundrymen), who, in his well-thought-out remarks, interspersed witticisms in voicing the appreciation of himself and his colleagues.

Institute of Metals Awards

The Council of the Institute of Metals announces the following awards:—*Institute of Metals (Platinum) Medal for* 1960 to Professor Robert Franklin Mehl (head, Department of Metallurgical Engineering, Carnegie Institute of Technology, Pittsburgh) in recognition of his outstanding contributions to the science of metals and to metallurgical education. *Rosenhain Medal for* 1960 to Professor Norman James Petch (William Cochrane Professor of Metallurgy, King's College, University of Durham) in recognition of his outstanding contributions in the field of physical metallurgy, and the *W. H. A. Robertson Medal and Premium for* 1959 to Dr. Maurice Cook and Mr. E. Swainson (formerly chairman and assistant manager, technical department, respectively, Imperial Chemical Industries, Limited, Metals Division, Witton, Birmingham) for a paper on "Arc Melting of Reactive and Refractory Metals."

The death has occurred at the age of 70 of Mr. HERBERT HOWARTH, for 30 years chief draughtsman with Thomas Robinson & Son, Limited, woodworking and flour-milling machinery makers, of Rochdale.

Electric Smelting on a Contract Basis

Birlec-Efco (Melting), Limited, instal Pilot Plant in New Premises at Aldridge, near Birmingham

For the first time in Britain, a contract service has been made available for electric smelting, and a pilot plant, built by Birlec-Efco (Melting), Limited, is now in operation for this purpose at the company's premises at Aldridge, near Birmingham. Erected primarily to promote the development of electric smelting processes, it follows that a potential user of electric smelting is given a good chance of finding out the behaviour of his ore in such conditions, and the economics of metal extraction from it. Customers' raw materials are accepted in trial batches for testing their amenity to electro-thermal reduction, determining the most suitable smelting technique, and assessing the nature of the resultant products. At a fee agreed in advance, the pilot smelting-furnace—which provides full-scale testing facilities—is operated on customers' raw material. Finished products and the balance of materials are returned to the customer. The plant is of such a size that valuable information is gained on important factors such as power and electrode consumption, operating voltage, percentage recovery, and other relevant data.

This information can be scaled up so that a fairly accurate appraisal can be made of what can be expected on a large-scale plant. At the end of the test, the customer is furnished with a full report, giving recommendations on smelting practice, electrical ratings and size of installation required for a given output.

The Furnace

The furnace, with a shell of 8-ft. i.d., is situated at one end of a building specially designed and built for the purpose. It is surrounded by a charging platform at a height of 9 ft. from the main floor-level, and the furnace controls are suitably housed in a panel adjacent to the furnace operating-platform.

With a nominal rating of 350 kva., the furnace is designed to be as versatile as possible. A wide range of voltage-tappings has been provided, enabling—as far as is practicable—the whole series of present-day electric-smelting applications to be covered. To determine the effect of shell rotation for different smelting operations, the furnace body can be rotated or oscillated in either direction at varying speeds.

Three tapholes are provided, the levels of which can be altered for slag and metal. They are served by a monorail beneath the platform, forming a loop surrounding the shell which carries slag pots and/or metal ladles. Several thermocouples are built into the refractory lining to monitor the temperature of the hearth and sidewalls at different points.

The furnace is equipped with holders suitable for 8-in. dia. electrodes, which can be of amorphous carbon or graphite according to the requirements of the tests. Smaller electrode holders can be fitted if necessary. The clamps are arranged for remote control by pneumatically-operated cylinders as part of the Amplidyne system.

Designed so that it can operate as an open-top furnace or with the top closed by the superimposition of a roof, the furnace is also arranged so as to permit fume removal or gas extraction. It is capable of smelting calcium-carbide, iron or manganese ores, nickel and copper concentrates, and also of producing ferro-silicon and ferro-chrome. It is also suitable for the treatment of slags and for many other electro-thermal processes. Available to any company interested in carrying out tests on electro-thermal processes, the installation has self-contained laboratory facilities, and a competent staff is available to carry out development work.

Layout of the Building

The building, specially designed to house the pilot smelting furnace, has a total floor area of 5,700 sq. ft., the main contractors for its erection being Robert M. Douglas (Contractors), Limited. It is served by a 5-ton capacity overhead-travelling crane, the maximum height of lift being 26 ft. The sub-station, which is integral with the main building, is in an area adjoining the furnace and platform. Ample provision has been made for storage of refractories, electrodes, and raw materials, and equipment for crushing, ladle heating and casting has been installed. The sub-station houses the high-voltage contactor, the furnace

FIG. 1.—*Preparing to tap the new furnace set up for pilot smelting, at Aldridge.*

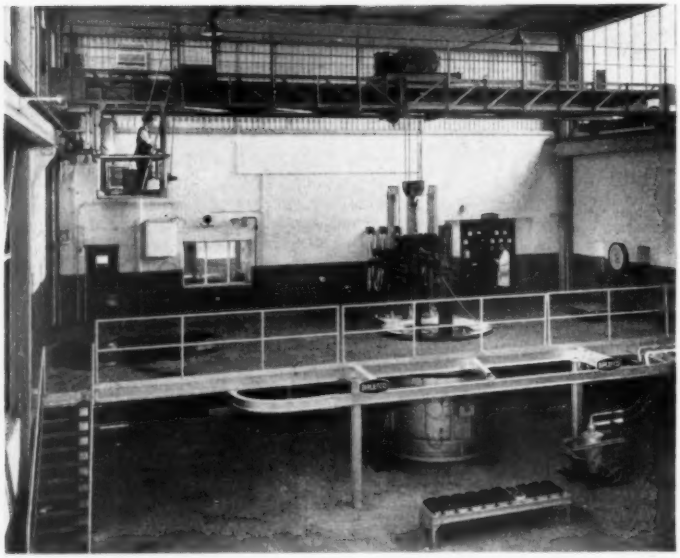


FIG. 2.—*General view of the Birlefco pilot smelting plant showing the operating platform and the overhead-travelling crane.*

transformer, an 0.7 kw Amplidyne electrode-controller and the low-tension distribution board.

Electrical Equipment

Transformer: Nominally rated at 350 kva., the BTH three-phase transformer has an ancillary cooler, enabling higher outputs to be attained for special smelting applications. Full output is available on all secondary tappings.

Power Supply: Control of the power supply to the furnace is provided by the high-voltage contactor, backed up by an oil circuit-breaker which gives protection against short-circuit and excessive overload. Under-voltage protection is also provided in the contactor.

Electro-thermal Smelting

An economical method of producing the very high temperatures required for the reduction of many ores can be provided by the use of electro-thermal smelting, such as is provided in this new installation. This method is also used where contamination of the product by ash in a more-conventional solid-fuel process is undesirable. For certain metals and alloys, electric smelting is accepted as the only economic process. The method is also gaining acceptance in the production of what are generally known as the " rarer metals " and other alloys.

However, though accepted for over 50 years as a feasible method for extracting metals from their ores, only in recent years has electric smelting been carried out on a significant scale. The main factor contributing to this development is the relative cheapening of the unit cost of electricity when compared with other fuels. This applies particularly abroad, though it is stated by some authorities that a reduction in the price of electricity to around 0.4d. per unit might make the use of the electric furnace economic in this country, even for smelting iron.

Some Applications

Ferro-alloys: The furnace can be used to produce many of the metals in this group, including ferro-silicon, ferro-chromium, ferro-manganese and ferro-tungsten.

Silicon: Silicon metal with a purity exceeding 96 per cent can advantageously be smelted in electric furnaces. The main use of silicon metal is as an alloying element for non-ferrous metals, in particular copper and aluminium. Silicon is also used as a reducing agent in the production of certain ferro-alloys.

Iron Smelting: Where economic conditions are favourable, electric-smelting furnaces for pig-iron production are installed in various parts of the world, with capacities up to 220 tons per day. The blast-furnace is still the principal metallurgical equipment for producing pig-iron, but it depends for its operation on supplies of high-grade metallurgical coke. In countries where hydro-electric power is plentiful, and its cost compares favourably with that of metallurgical coke, electrically smelted pig-iron can be produced more economically than the blast-furnace product. Some 3,000,000 tons are produced annually throughout the world by this method.

Phosphorus: Phosphorus is produced in its elemental state from phosphate rock, in an electric smelting furnace, and is used in the production of the various phosphorus compounds required by industry, especially for fertilizers and detergents.

Non-ferrous Metals: Under certain conditions electric smelting can be used advantageously in processes concerned with the extraction of many non-ferrous metals, including copper, nickel, tin and zinc.

Conclusion

Although Birlec-Efco (Melting), Limited is interested in the promotion of this furnace in Great Britain, it is felt that there is even greater scope overseas. Apart from contract smelting, it is envisaged that a primary application of the pilot plant will be the proving of ores brought in token quantities from abroad. Data will thus be provided on which large-scale extraction plants can be built at or near the ore-field.

Equipment and Supplies

Furnaces for fusing Vitreous Enamels

Gebr. Ruhstrat, Göttingen, through their sole distributors in the UK, British Sarozal, Limited, 22, Berners Street, London, W.1, have issued publication 06166 printed in English to describe and illustrate two designs of electric vitreous-enamelling furnaces. The first is of the horizontal muffle type, wherein the charge (using a handwheel) is racked in and out of the furnace. Here, the door opening and shutting is operated by a lever from the loading and unloading position. The second is a vertical tower-type furnace, for which loading and unloading is effected by a power-driven conveyor. A diagram of this furnace is printed in the brochure, showing three batches of ware being simultaneously treated. By careful timing and good instrumentation, working of this furnace can be continuous. Amongst the advantages claimed for this furnace are that a very wide range of goods can be handled, that it has a very short firing cycle, and that an immediate changeover from groundcoat to covercoat firing can be effected. The large illustration of the furnace in the brochure gives the impression that nine lengths of guttering are being handled as one batch. It would appear that this is a type of plant unfamiliar to the vitreous-enamelling industry in this country; the manufacturers are old established, and produce a wide range of electric furnaces, mainly of the smaller type, including vacuum furnaces.

Shell-moulding Machine

The European office of the American firm of National Acme Company (6, Dukes Road, Lindfield, Sussex) announces an addition, known as the HOS-5 model, to the Shalco range of shell-moulding machines. This machine is designed on the general principle of dump-box machines, but built-in gas-heating has been incorporated for the patternplates, instead of electric-resistance heaters. (Although the latter usually gave excellent results, the view was held that the system was expensive, because each plate required its own set of heating elements if changeover from one plate to another was to be avoided.) To accomplish this heating a gas manifold (see Fig. 1), rectangular in shape, is bolted to the back of the angle-iron patternplate frame on the new Shalco machine. Then, with the patternplate in position (see Fig. 2), gas flames shoot out parallel with the plate from around its perimeter, giving, it is claimed, a constant heat all over.

Other Details

A universal joint on the gas manifold ensures that it can travel freely with the patternplate. The effective patternplate area of this two-station machine is 18 by 24 in., the complete unit weighing 16 cwt. An air pressure of 100 lb. per sq. in. is necessary for the unit's operation, and its two ½-h.p. motors require electric-power amounting to 18 kw. Gas consumption is about 50 to 60 cub. ft. per hr., and with automatic control of investing and curing cycles it is claimed that a shell output of 50 to 100 per hr. can be achieved, depending on the complexity of patterns.

Tramp-iron Diverter: Rapid Magnetic, Limited, Lombard Street, Birmingham 12, announce that their range of tramp-iron diverters has now been extended to cover burdens beyond the capacity of conventional pulley and pulley-type separators. A typical unit now available for the recovery of iron-bearing slag is 42 in. dia., 60 in. wide and weighs approximately 6½ tons. High-temperature class-B insulation is used throughout, to cater for the treatment of hot slag.

Packing Sleeves: The problem of packing exothermic sleeves so as to prevent breakage during transit has been solved by Foundry Services, Limited, in co-operation with Spicers, Limited, Loughton, Essex, using their Carbion sleeves. This new product is claimed to permit of easier wrapping, to save considerable space, and to very materially reduce breakages.

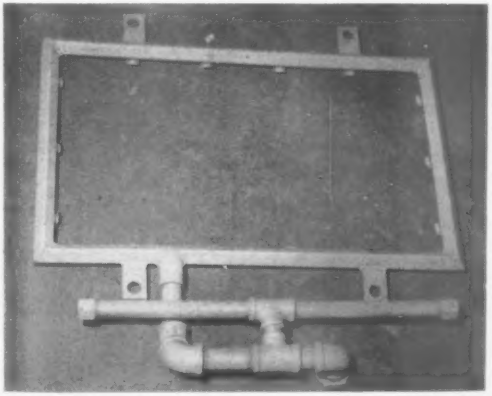


FIG. 1 (*above*).—*Patternplate-frame, gas-heater and manifold for the Shalco shell-moulding machine.*

FIG. 2 (*right*).—*Patternplate, complete with its heater assembly, moving over towards the dump box of the machine; the gas manifold has a universal joint.*

Notes from the Branches

Lancashire

There was a very good attendance at the February meeting of the Lancashire branch of the Institute of British Foundrymen when Mr. G. Ulmer, chief of the department of melting and moulding studies of the *Centre Technique des Industries de la Fonderie*, Paris, presented a paper on the "CTIF-Ulmer Hot-blast Cupola." Mr. Ulmer commenced by giving structural details of the cupola, using diagrams, photographs and formulae to illustrate certain points. It was an established fact, he said, that hot-blast cupolas produced about 30 per cent. higher output than the cold-blast type whilst the saving in coke could be about 30 per cent.; melting losses were reduced by 12 to 15 per cent. With the hot-blast cupola, a higher percentage of steel in melts was possible, and the higher temperatures produced made oxidation of the charge constituents less likely. Another advantage was that lower grades of coke and pig-iron could be used successfully. The system under consideration, he said, was flexible; melting control was simple—an ability to control natural draught was all that was necessary—whilst operating costs were reduced to a minimum. Mr. Ulmer mentioned in conclusion that the CTIF cupola was patented in France and all other countries.

At this point Mr. F. W. Nield, branch senior vice-president, proposed a vote of thanks to the lecturer, and in seconding the proposal Mr. Fleming opened the discussion by asking if the quoted figure of 15 per cent. reduction in melting loss was correct. Also, was the recuperator temperature 150 deg. higher than the air temperature?

Mr. Ulmer, who throughout the discussion replied to questions through Mr. C. M. G. Wallwork, said that the melting loss referred to was that of silicon, and the temperature difference between the furnace "shell" and air was 100 deg. C.

Discussion

Replying to various questions, Mr. Ulmer said that the CTIF furnace and a cupola with a Schack recuperator could not be compared. In his design, both air and gas flowed in the same direction; the shell temperature was around 600 deg. C. and chrome steel was used for making this part. During the blow-down period, the recuperator lid was raised, but, generally speaking, dust and grit produced with hot-blast operation was much less than in cold-blast practice. To overcome difficulties associated with the UK Clean Air Act, a spark- and grit-arrester could be fitted, and if necessary this could be added after erection of the furnace. The author claimed that as all the gases passed through the recuperator, fumes were non-existent.

Replying to a query as to the amount of air necessary to reduce shell temperature sufficiently, Mr. Ulmer said that with the doors open the air intake was ample for this purpose. With his furnace, inferior coke—*i.e.*, small, easily crushable coke—could be used; in hot-blast cupola operation coke size was not so important, he thought. Operating time was normally an eight-hour day in France and the extra cost of the plant under these conditions could be saved in a year's operation; no trouble had so far been experienced due to heat effect on welds in the construction of the shell. A normal period for acquiring maximum temperature of operation was 30 to 45 minutes from the time of starting up. Explaining the construction further, Mr. Ulmer said the recuperator was fastened to the top of the stack and the ratio of the radiation area of his parallel-flow recuperator was comparable with that of a contra-flow recuperator for the same furnace, but he obtained a saving through the use of cheaper materials. A maximum economic melting rate was about 4 tons per hour, there being no advantage when melting at a rate of 6 tons per hour. To save heat losses, the downtake pipe was lagged and then the temperature drop was only about 20 deg. A hot-blast plant of this type cost about three times as much as a cold-blast unit of the same size.

Still discussing details of operation, Mr. Ulmer said the charging door of the furnace was best kept closed between charges; either continuous or intermittent tapping could be used and the occurrence or absence of hard "tapholes" depended on the skill of the furnaceman. Contrary to one opinion expressed, the author said he would not expect any difficulty with continuous tapping of small furnaces even below three tons per hour output. Mechanical charging of the furnace was advocated, and even if a drop-bottom bucket were used, delivery of the material into the furnace should be arranged *via* a chute. To small hot-blast cupolas, it was usual to fit tuyeres having total areas about 50 per cent. greater than for comparable cold-blast units, but in the larger sizes of furnaces differences were not so great. To the postulation that high coke-ratios with this hot-blast unit might result in melting the shell, Mr. Ulmer said water-cooling took care of this. Other things being equal, after an eight-hour run, the amount of lining burn-back with his cupola was comparable in volume with a cold-blast unit, but with hot-blast operation depth of burn-back might be greater over a shorter zone.

Closing the discussion, the chairman said he had seen a hot-blast plant of similar type to the one described, which was just about to be cleaned out after three years' operation, and he thought this was a very good achievement. He thanked Mr. Ulmer for his paper and members showed their appreciation in the usual manner.

South Africa

"Mechanical Coremaking" was the title of the paper read by Mr. C. Campbell to the January meeting of the South African branch, held in Johannesburg, under the chairmanship of Mr. D. Gordon Jones, senior vice-president.

Mr. Campbell commenced his lecture by stating that, due to the technical progress which has been made in the development of machines, engines and other equipment, castings of a more intricate nature were being called for from the foundryman. Since these castings came into the high-production class, it was fitting that more cores were being used: their adoption eliminated loose-pieces, etc., and allowed castings to be produced at more economical rates. In many cases to-day, he continued, more coremaking than moulding was required to produce some types of castings, the engine cylinder-block, constituting a box of sand into which was dropped an assembly of cores, being a typical example.

Development of Coreshooting

Mechanization of coremaking, said Mr. Campbell, was becoming increasingly important to ensure savings in costs and manpower. Then by means of slides he traced the development of coreblowing, jarring, and ramming as well as of the old faithful "sausage machine." He went on to say that experimental work carried out to overcome the problems of mechanical coremaking, had led to the development of coreshooting machines. The fundamental idea behind this development was to abandon the technique of blowing

sand into the corebox together with air, and to give the sand such an acceleration through the expansion of a fixed quantity of air, that even very intricate coreboxes could be satisfactorily filled. Since no sand/air mixture was produced during the sudden air impact on the sand in the container, corebox wear (originally due to the "sand-blast effect"), was eliminated. Further, it was possible to use strong sand, because the pneumatic-loosening system provided stirred the sand after each shot.

Coreboxes

Dealing next with the materials for making coreshooting coreboxes, Mr. Campbell said that either wood, metal or plastic might be used; the choice depended upon the production required. He emphasized that when making coreboxes, accurate machining of joints, loose-pieces, etc., was essential for use on a "shooter," also that, wherever possible, large cores should be lightened in order to conserve sand and to facilitate uniform drying.

The remainder of the paper consisted of a series of slides depicting various types of coreshooting machines and including a combination type used with the CO_2 Process in which the gassing cycle is preset and the cores automatically gassed. A lively discussion followed the presentation of the paper and the proceedings were concluded by a hearty vote of thanks being proposed by Mr. I. R. Duncan, a branch Council member.

Works Visit

For the first works visit of 1960, the branch visited, in February, the works of C. J. Fuchs, Limited, one of South Africa's leading domestic-appliance manufacturers, the principal products being electric ranges and refrigerators. The works are situated in Alberton, about 10 miles from Johannesburg. The buildings cover over 500,000 sq. ft. of floor area situated on 20 acres of land, and approximately 1,500 persons are presently employed.

The first division visited by the foundrymen was the tool-room where the company make most of their own dies and are currently experimenting with the use of reinforced fibre-glass dies for metal forming. In the sheet-metal division, the initial processing of the 1,400 types of components commences with the cutting of sheet steel on guillotines with capacities of up to 12 ft. In this department 1,000 tons of sheet steel are stacked to meet the factory's requirements of 400 tons per month.

Equipment in the press shop ranges from hand-operated fly-presses to a 2,500-ton press capable of pressing out a domestic bath—at the time of the visit the large press was producing 11-cub. ft. refrigerator doors. In an adjoining bay was housed the plastics-processing division and here members were particularly intrigued with the vacuum-forming machines, one of which was the conventional horizontal machine and the other a vertical type, both designed and constructed in the Alberton works. A sheet of plastic measuring 56 by 27 by almost $\frac{1}{4}$-in. thick was placed on the vertical machine and after a few seconds of preheating, the air was evacuated from the die and the plastic, as it were, sucked into the die. In a matter of seconds, half-a-dozen compartments were formed to make the inner-door panel of an 8-cub. ft. refrigerator.

In the holloware department, teapots, jugs, hot-water cisterns, etc., are made and the ground-coat for enamelling is applied. The black-enamelled rim on jugs, wash-basins and the like is applied to the units as they rotate on a type of potter's wheel. The enamelling bay consists of conventional batch-type ovens and a continuous furnace which contains three firing zones for the fusing of the cover-coat. During the visit to the assembly line, the visitors were told that the current output per day is 65 to 70 electric ranges and 110 refrigerators. The final call of the visit was to the testing shops where endurance and performance tests are conducted on the complete units as well as component parts.

The visitors were entertained to tea at the conclusion of the visit, when Mr. D. Gordon Jones, senior vice-president, thanked the management for their courtesy and hospitality. He commented on the type of notices displayed throughout the works, urging the staff to maintain the highest quality and, in particular, mentioned one sign which could be applicable for foundrymen: "Quality cannot be inspected into a product—it must be built into it." Mr. C. J. Fuchs, the chairman and managing director, replied to Mr. Gordon Jones, and was particularly high in his praise of his staff and their team efforts. The visitors were presented with a handsome ash-tray which had been produced to commemorate the 30th year since establishment of the company in 1929.

Social Evening

On February 10 the first social evening for 1960 followed the pattern of those previously held and members with their wives and guests attended in goodly numbers. A coloured slide and film show was presented by Mr. W. L. Campbell-Pitt, managing director of one of the branch subscribing-firm members. The slides depicted a variety of tourist attractions in France, and the film showed construction details of the Kariba Dam in the Central African Federation.

The main feature of the evening was another film, compiled over the years by Mr. Campbell-Pitt during his many visits to South Africa's famous natural game reserve, the Kruger National Park.

At the conclusion of the presentation, Mr. Campbell-Pitt was thanked, on the members' behalf, by the branch president, Mr. K. H. Coombs.

London

At the London branch meeting on February 24 at the Constitutional Club, Northumberland Avenue, London, W.C.2, the speaker was Mr. G. R. Webster of the British Bath Company, Limited, Greenford. In his lecture entitled "Modern British Bathmaking Practice," Mr. Webster traced the development of mechanization and automation for the production of domestic porcelain-enamelled cast-iron baths from the early foundry methods to the fully-continuous system operating in the lecturer's company. The speaker also discussed the application of water-cooled hot-blast cupolas, the influence of acid and basic working and a continuous slagging-system. Process-control arrangements and the fashion trend in cast-iron bath design and the influence of colour were also points touched upon. The lecture was illustrated by the showing of a sound film and a series of lantern slides.

An interesting discussion followed the presentation of the paper, and such points as the composition of the metal charge, the training of operators, pattern "life," the system of water-cooling, melt tonnage and hours of blast were covered. After the discussion, Mr. D. C. Paterson proposed a vote of thanks to Mr. Webster for his interesting paper and Mr. L. A. S. Harbourne seconded.

Personal

Mr. DUNCAN MCDONALD has joined the board of Bruce Peebles & Company, Limited.

Mr. DOUGLAS LATHAM has been appointed a director of Edwards High Vacuum, Limited.

Mr. H. P. POTTS has accepted an invitation to join the board of Rockwell Machine Tool, Limited, a member of the Coventry Gauge & Tool group.

Mr. I. LEVIN has been appointed deputy chairman of G. R. Turner, Limited, wagon builders and general engineers, Vulcan Works, Langley Mill, Nottingham.

Mr. J. M. KERSHAW, director of development and market research, has been appointed alternate to Mr. T. P. BERINGTON on the board of Monsanto Chemicals, Limited.

Captain H. LEIGHTON DAVIES, assistant managing director of the Steel Company of Wales, Limited, is to succeed LORD MONCKTON as chairman of the Industrial Welfare Society and its Council.

Mr. SAMUEL SMITH, commercial manager of R. B. Tennent, Limited, rollmakers, Coatbridge, has been appointed to the board of directors. Mr. Smith has been with the company for 37 years.

Mr. A. E. FROST, a deputy treasurer of Imperial Chemical Industries, Limited, has been appointed treasurer in the place of Mr. J. H. COTTON, who retires on March 31 after 32 years with the company. He has been treasurer since 1952.

Mr. THOMAS P. EVERETT has joined the board of Hawker Siddeley Brush Turbines, Limited, as sales director. Previously Mr. Everett was executive director in charge of the atomic division of Richardsons, Westgarth & Company, Limited.

Mr. W. MASON and Miss NELLIE GEORGE, employees of Samuel Heath & Sons, Limited, general brassfounders, Leonard Street, Birmingham, have been the recipients of cheques from the management in recognition of their 65 years' service with the firm.

Mr. GEORGE C. THOMPSON and Mr. GEORGE E. LUNT, have been appointed to the board of the Staveley Coal & Iron Company, Limited. They are managing directors respectively of its subsidiaries, the British Soda Company, Limited, and the Bradley & Foster group.

Mr. P. L. ANDERSON, who started as office boy and is now secretary of Lane & Girvan, Limited, ironfounders, Bonnybridge, is leaving the firm to take up another appointment. In recognition of his services he was presented with a cheque by Mr. James Ferguson, managing director.

Sir STUART GOODWIN, the Sheffield industrialist, has given the Bishop of Sheffield, Dr. Leslie S. Hunter, £1,000 to provide a short holiday for clergymen from the Sheffield Diocese. A committee of Rural Deans has arranged with Butlins, Limited, for the families to go to Skegness at the end of August at a special rate.

Mr. BJORN ROSEN has arrived in this country to take up his appointment as managing director of Sandvik Swedish Steels, Limited, Halesowen, Birmingham. Mr. Rosen, who was born in 1925, studied mining engineering at the Royal Institute of Technology in Stockholm and later attended the School of Economics, Stockholm.

Mr. E. D. WHITEHEAD has been appointed a Director of Electrical Inspection in the Ministry of Aviation in succession to Brigadier C. A. ZWEIGBERGK, whose tour of duty in the Ministry will end at the beginning of April. Since 1957, Mr. Whitehead has been in charge of a division of the Electrical Inspection Division Directorate responsible for the inspection of electronic equipment.

Powell Duffryn, Limited, announce that following Mr. B. HEATH'S resignation, on February 29, from his managing directorship of Powell Duffryn Carbon Products, Limited, and directorships of other companies in the group, Mr. R. TURNER, acting managing director of Powell Duffryn Technical Services Limited, has joined the board of Powell Duffryn Carbon Products, Limited, as deputy chairman. Mr. F. W. STOKES, a director and present works manager of the company's factory at Hayes, has been appointed general manager.

New chairman of Davis & Lloyd (1955), Limited, a wholly owned subsidiary of the English Steel Corporation, Limited, Sheffield, is Dr. C. J. DADSWELL. Davis & Lloyd carries out the design and sale of specialized types of cast-steel railway bogies. It is an old-established business with many American associations. The firm was purchased by English Steel in 1955. In taking up his new appointment, Dr. Dadswell, who is a director of the parent company, relinquishes the office of managing director of Davis & Lloyd. He is succeeded in that position by Mr. C. MUIRHEAD, who is special director of English Steel.

Following his visit to Egypt, as leader of the British trade mission to the United Arab Republic, Mr. H. G. NELSON, managing director of the English Electric Company, Limited, visited Ethiopia last week and is visiting the Sudan this week, in his capacity as industrial leader and vice-chairman of the Advisory Council on Middle East Trade. The object of the visits is to assess trade prospects with these countries and to make personal contacts with Ministers, Government officials, and members of business communities. Mr. Nelson is being accompanied by Mr. K. E. MACKENZIE, executive secretary of the Advisory Council on Middle East Trade.

Mr. NORMAN READMAN, managing director of the Consolidated Pneumatic Tool Company, Limited, London, makers of compressors and compressed-air equipment, a wholly-owned subsidiary company of Chicago Pneumatic Tool Company, New York, has been elected to the board of directors of the New York parent company. Mr. Readman remains managing director of the Consolidated Pneumatic Company in London and from there continues to be responsible for the Chicago Pneumatic's operations throughout the world outside of the western hemisphere. Mr. Readman, who is a Fellow of the Institute of Chartered Accountants in England and Wales, joined Consolidated Pneumatic in 1943. He was appointed a director in 1947 and managing director in 1953, and is the first Englishman to be elected to the parent company's board.

Mr. H. W. SECKER has relinquished the chairmanship of the Renishaw Iron Company, Limited, a member of Tube Investments group, but has joined the executive board of the iron and steel division of Tube Investments. Mr. C. H. T. WILLIAMS, vice-chairman of the iron and steel division of Tube Investments, has been appointed chairman of Renishaw Iron Company in succession to Mr. Secker. Mr. Williams is also chairman of Park Gate Iron & Steel Company, Limited, Rotherham, and of Round Oak Steel Works, Limited. He is Senior Warden of the Cutlers' Company, Sheffield, and is due to succeed as Master Cutler next year. Mr. H. H. DRAYCOTT, director of Renishaw Iron Company, Limited, since 1951, and secretary, has been appointed director and general manager.

Hepworth & Grandage Expansion

Plans for their 1960 development programme, involving capital expenditure in excess of £700,000, were announced last week by Hepworth & Grandage, Limited, precision engineers of Bradford. A large proportion of this sum will be spent in the modernization of plant and machinery and the installation of specifically-developed production equipment, to ensure that the company remain competitive in the world's markets, and for the improvement of working conditions in the group's various factories. Large sums have also been allocated to new building schemes.

Work on the first phase of the development plan—the construction of a new engineering and metallurgical research laboratory building—has already commenced. This will adjoin the company's administration block, itself completed only three years ago. The new building will provide 26,520 sq. ft. of accommodation and will house the design drawing office and technical department, physics and chemical laboratories, the works photography department and engine research department. The new laboratories are expected to make a notable contribution to the British motor industry's technical and scientific development.

Another new project is the conversion of the company's boiler plant to burn pulverized coal, by the installation of Adamson packaged-type boilers and a pulverizing plant. The company consider this type of fuel to be not only the most economical, but also desirable in the national interest. Extensions to the foundry will give new capacity for the production of shell-moulded castings in spheroidal-graphite iron. The company see a big future for shell-moulding as a means of reducing the costs of components for motor cars, refrigerators and other machinery.

Plant Engineers' Annual Conference

This year's annual conference of the Institution of Plant Engineers is to be held at the Grand Hotel, Scarborough, from May 4 to 6, when a number of papers of wide scope and interest will be presented. The two principal papers will be those of Dr. Richard Weck, director of research, British Welding Research Association, and Mr. F. S. Walker, chairman, Lever Brothers, Port Sunlight, Limited. Dr. Weck's paper will have as its subject "Developments and Problems in Welding," whilst Mr. Walker will deal with "People—the Most Important Factor in Industry." In view of the response to similar invitations in past years, the Council of the Institution is again inviting some of the principal industrial concerns to nominate senior staff to attend the conference.

The conference dinner will be held on the evening of May 5, when the principal speaker will be Mr. Philip Mayne, technical director of the Billingham Division of Imperial Chemical Industries, Limited.

Long-term Production of Iron Castings

In response to a request from the Iron and Steel Board, the Executive Committee of the Council of Ironfoundry Associations agreed that there is a need for a further investigation of the industry's probable, or possible, future production on a long-term basis, and has decided to set up a small sub-committee to carry it out. Those appointed are Mr. H. A. Bonney, Mr. M. M. Hallett, Mr. R. L. Handley, Mr. C. G. Mackie, and Mr. H. V. Shelton. Mr. Mackie has been appointed chairman of the committee which held its first meeting on February 24.

Glover & Main's Reorganization

A number of major changes are being made in the locations of the Glover & Main group factories. The reorganization contemplated entails considerable redeployment of plant but is expected to secure not only an economy in production, but at the same time, make provision for a greater future output. The following are the major changes.

The entire production of components for gas meters hitherto undertaken by Thomas Glover & Company, Limited, at Edmonton, has been moved into the three factories of Meters, Limited, in the Oldham and Manchester districts. A new centralized administrative and research building is being planned on the Oldham site to house the executive and development staffs of the two companies. The meter-assembly shops at Edmonton will remain to serve the southern England Gas Boards. Mr. G. Barlow has been appointed managing director of both the above concerns.

The second major change concerns the factory of Thomas Glover & Company, Limited, at Edmonton. This factory has been handed over to R. & A. Main, Limited, for use for the production of refrigerators, and modern mechanized equipment is now being installed. It is hoped that later this year, this factory will be in full production.

Finally, preliminary steps are being taken to amalgamate production of the two companies within the group which manufacture appliances where gas is used for heating water for one purpose or another. Main Water Heaters, Limited, and Morley Products (Padiham), Limited, will amalgamate in a new unit to be located at Padiham. Here, a factory of some 160,000 sq. ft. has already been erected on a 30-acre site. Mr. W. K. Tate (previously managing director, Thomas Glover & Company, Limited) will become managing director of the new joint company.

Courses at National Foundry Craft Training Centre

The National Foundry Craft Training Centre, West Bromwich, announces that two more First Courses are to be held at the Centre. The first of these will commence on May 30 and continue until June 23, and the second will be from September 19 until October 14. It is stated that the Centre has now been able to eliminate the backlog of applications and can accept new ones for these forthcoming courses. Foundry managements wishing to enter apprentices or trainees for them are invited to do so as soon as possible—more vacancies are available for the May than for the September course. Applications for places should be made to the secretaries of the Centre, 69, Harborne Road, Edgbaston, Birmingham 15.

RSA Endowed Prizes, 1960

The Royal Society of Arts, as trustee for the undermentioned endowments, offers the following prizes during the year 1960:—The Howard Prize of £50 which will be awarded to the author of a treatise on some aspect of the subject of motive agents, and the Fothergill Prize of £20 which is offered for a descriptive essay or model embodying some new idea for the prevention or suppression of fire. The Howard Trust was established in 1868, and the Fothergill Trust was established by the will of Dr. Fothergill in 1821. Details of the general conditions of entry for the competition are available from the Society at John Adam Street, Adelphi, London, W.C.2.

News in Brief

BRITISH TRANSPORT DOCKS are about to embark on a major scheme which has been approved by the British Transport Commission for improvements at Grange Dock, Grangemouth, at an estimated cost of £1,700,000.

Mr. E. G. CHANDLER, personnel manager of General Refractories, Limited, Sheffield, opened a new canteen seating 100 at the company's brick works at Worksop on March 4. It meets an increased demand for hot mid-day meals.

Mr. REGINALD MAUDLING, President of the Board of Trade, toured the Austin Motor Company's works in Birmingham on March 4 and paid tribute to the industry for "a magnificent response to the Government's campaign to divert industries to zones of unemployment."

FOUR LABOURERS at a workshop at Anderston's Foundry, Port Clarence, near Middlesbrough, on February 24, were splashed with molten metal when there was a blow-back from the casting soon after the metal had been poured in. The injured men were treated for burns at Middlesbrough General Hospital.

WORK HAS BEGUN at the Belfast shipyard of Harland & Wolff, Limited, on a major long-term reconstruction and modernization scheme. The scheme will enable Queen's Island to build tankers of up to 100,000 tons. The company has described as "without foundation" a report that the scheme will involve a reduction in capacity.

GUEST SPEAKER at the annual luncheon of the Birmingham branch of the British Institute of Management was Lord Ritchie, chairman of the Stock Exchange, who said *inter alia* that in January the Stock Exchange had received 1,100 inquiries from new investors. The comparative figure for January, 1959, was 170 and the total for last year was 2,600.

PLANS FOR A NEW TECHNICAL COLLEGE in Midlothian are proceeding steadily, said Mr. Robert Anderson, chairman of the Midlothian Education Committee, at the annual prize-giving ceremony of the Esk Valley College, Newtongrange, on March 4. The prizes were presented by Mr. A. E. R. Taylor, managing director of Alex. Cowan & Sons, Limited, Penicuik.

G. PERRY & SONS, LIMITED, the Leicester pattern-makers, have completed a 31-ft. long and 15-ft. wide pattern—the largest in their 70-year history. It is to be used for a steel casting which will be made by the English Steel Corporation, Limited, of Sheffield. The cast steel weight is expected to be 160 tons, and total weight of the steel to be poured into the mould is likely to be 200 tons.

A DRAFT STANDARD which is of interest to manufacturers of malleable-iron washers (A 4400) has recently been issued to industry for comment by the British Standards Institution. The draft deals specifically with steel washers but provides for "other materials" to be specified by the buyer. The draft is obtainable from the Institution at 2, Park Street, London, W.1; price 3s. 6d.

AT THE ANNUAL LUNCHEON on March 3 of the Wolverhampton area of the National Union of Manufacturers, Mr. John Fallon, chairman of the Incandescent group of companies, urged the need for increased co-operation among small industries, universities and research centres. He said that the smaller industries were of major importance to the national economy because their total capital and labour dwarfed that of the larger industries.

The NON-FERROUS CLUB proposes to hold its annual golf meeting at the Stratford-on-Avon Golf Club on June 21. As in previous years, the meeting will be open to members of the Non-Ferrous Club Golfing Society, and other players connected with the industry will also be welcome. Those interested in the meeting should write to the secretary, Mr. R. Deutsch, at Deutsch & Brenner, Limited, Alliance Works, Harford Street, Birmingham, 19.

FIRTH-VICKERS STAINLESS STEELS, LIMITED, held their annual staff dance at the Cutlers' Hall, Sheffield, on March 4. Those present included Dr. C. S. Sykes, chairman, Mr. J. T. W. Dewar, managing director, Mr. G. W. Ashton, general works manager, Mr. J. R. Edwards, superintendent at Shepcote Lane, and Mr. Hugh Wentworth-Ping, general sales manager. Mr. W. D. Pugh, managing director, English Steel Corporation, Limited, was also present.

ON JANUARY 25, the foundry of Fry's Diecastings, Limited, Stourbridge, was flooded by water from a nearby stream. Some 80 units of proprietary vacuum-processed metallic sodium were under 2-3 ft. of water for six hours. The fact that no explosion occurred in spite of this long immersion speaks well for the individual containers and the manner in which this sodium is packed. The units have been dried off and are being used in a normal manner.

FRANCE'S TARIFFS of hematite and specular pig-iron have been reduced to 4 per cent. and those for certain special steel grades to between 3 and 8 per cent. At the same time the levying of a compensation tax has ceased on these types of iron and steel, which although imported from other member countries of the ECSC, actually originated outside the ECSC block. These tariff adjustments are part of the programme to "harmonize" iron and steel tariffs inside ECSC.

STANTON IRONWORKS COMPANY, LIMITED, near Nottingham, has received an order worth about £127,000 from the Argentinian Ministry of Public Works and Services, Buenos Aires, to supply 28-in. dia. spun-iron pipes with socket and spigot and bolted gland joints. The pipes are to be used for extensions to the existing water-supply systems in Argentina and first deliveries have already been made. Manufacture of the whole order will have been completed within eight weeks.

A PATENTS DELEGATION visited the USSR in November/December last year, and on their return an interim report was published in the *Board of Trade Journal*. The final report of the delegation, which also contains translations of the current Soviet laws and instructions to applicants for Patents and trade marks has now been published, and can be obtained from the sales branch, Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 2s. 6d. (by post 2s. 10d.).

AN ORDER worth more than £400,000 has been secured by the heavy plant division of Associated Electrical Industries, Limited, Rugby, for germanium rectifiers for the aluminium smelter at Bell Bay, Tasmania, owned by the Australian Aluminium Production Commission. This is the second major order to be received by the division in the last three months, the first was for Ardalog Sunndal Verk—the largest aluminium producer in Norway—for equipment with a capacity of 108 m.w.

A MEETING IS DUE TO BE HELD in London next month of the co-ordinating committee for the mechanical testing of metals, which has been set up by the International Organization for Standardization. This committee (ISO/METESCO) is concerned with cast iron as well as with steel, copper-alloys and light metals. Against the background of the "Inner Six" group of

countries and those of the "Outer Seven," the work of this committee is likely to have a greater practical significance than might at first be apparent.

TO FACILITATE further trade between Britain and East Germany, a second trade agreement has been concluded for this year between the Federation of British Industries and the East German Chamber for Foreign Trade. The new agreement provides for an exchange of some £7,000,000 worth of trade on both sides and quotas have been agreed for about £3,000,000 worth of manufactured goods each way—about £1,000,000 more than in 1959. In addition, the UK will also be given facilities to export iron and steel products worth £2,500,000 as well as goods worth £1,000,000 of non-UK origin.

CHEMICAL WORKS PROJECTS, LIMITED, has been formed by P.G. Engineering, Limited (of the Power-Gas group), Humphreys & Glasgow, Limited, and Simon-Carves, Limited, to supplement their normal activities by undertaking contracts for large fertilizer and chemical projects overseas. The joint company, thereby, will be able to call on extensive resources. The board will consist of Mr. J. P. V. Woolam, Mr. G. Gresle Farthing and Mr. R. W. Rutherford who will be the first chairman, each having an alternate director. The registered office of the company will be Simon House, 28/29, Dover Street, London, W.1.

ONE OF THE OLDEST FOUNDRIES in the West Country, the 250-year-old firm of Edward Cockey & Sons, Limited, Frome, is to close down at the end of this month. Originally bell casters, the company has for many years now been making gas holders and other equipment for the gas industry. The integration of gas production and the consequent closure of small works has led to a decreased demand for the company's products. In a statement to shareholders, the chairman of the company, Mr. C. Holmes Hunt, said it is impossible to continue trade because of the loss of work over the past three years. There had been no signs of improvement in 1959.

Mr. G. COLIN HEPWORTH, managing director of the engine components division of Associated Engineering, Limited, Leamington, announced on March 3 the expansion programme planned for the group's South African subsidiaries. Mr. Hepworth who has recently returned from a visit to South Africa said that a new factory is to be built at Johannesburg for the subsidiary Eugene Lauf and Lumenite. Personnel there will be doubled to 500 and the present production of pistons, cylinder liners and pins will be extended to include piston rings for all engines. Mr. Hepworth believes that the Union's industrial future is good and said that British cars are fighting a hard but successful battle in South Africa against strong competition.

THE YORKSHIRE ELECTRICITY CONSULTATIVE COUNCIL have been given an assurance that the increasing use of electric-arc furnaces in the steel industry will not detract from supplies of electricity to domestic premises. The Templeborough plan of Steel, Peech & Tozer, Limited, envisages the replacement of 21 open-hearth furnaces by six electric-arc types of 110 tons capacity each. The complete installation will consume 750 million units a year, six times the amount used at present, more than a third of the industrial load for Sheffield area, and as much as Manchester's domestic consumption. However, the works will be linked directly to the national grid, and a new electrical sub-station will be built near the Brinsworth mill.

THE ASSOCIATION of Supervisory Staffs, Executives and Technicians are to take legal advice about a decision by Walter Macfarlane & Company, Limited, iron-founders, Saracen Foundry, Glasgow, to introduce contracts of service for about 40 of their foremen. Mr. Robert McCusker, Scottish industrial officer of the Association, said that the foremen had been union members for the past 13 months. Repeated requests for union recognition had been rejected by the firm who, eventually, were given a month's strike notice unless recognition were conceded. The firm has countered by inviting members of the Association to sign a contract of service, the effect of which, might well eliminate trade union representation. The management refused to comment on the dispute.

PLANS OF EDINBURGH CORPORATION to establish a £1,000,000 technical college at Merchiston Castle (birthplace of John Napier, inventor of logarithms) have been threatened by opposition from owners of the property adjoining the site. The owners, who have been asked by the Corporation to sell their houses for demolition, have formed an "action committee" to resist acquisition and prepare a petition to the Secretary of State for Scotland. About 30 houses are involved. The occupiers complained that the main college building was to be much bigger than originally planned and would exclude daylight from their houses. Edinburgh Corporation have already spent about £15,000 on the site, mostly on restoring Merchiston Castle which is to be incorporated as the centre-piece of the new college.

Obituary

As reported in the JOURNAL last week, Mr. G. R. Woodward, of the British Cast Iron Research Association, died on February 26 at the age of 51. He joined the Association's staff in October, 1934, as librarian, and following service in the Royal Navy, he returned to the Association in 1946, when he was appointed manager of the information department, a post he held until his death. In this position he was responsible for all the Association's publications, conferences and exhibitions, and under his guidance the BCIRA publications have achieved an international repute, the high standard of accuracy being largely due to his editing. One of the most recent tasks upon which he was engaged was the production of the Association's *Journal of Research and Development* and *Bulletin of Foundry Abstracts* in a completely new form. (The first issue of the new publication is reviewed on page 314 of this JOURNAL.) Mr. Woodward was very well known to many members of the ironfounding industry; he was a man of wide interests and showed unfailing courtesy and good humour under the most trying circumstances.

The cremation at Lodge Hill Cemetery, Birmingham, on Wednesday, March 2, was attended by a large number of colleagues and members of the ironfounding and kindred industries.

Captain G. T. SMITH-CLARKE, former chief engineer and managing director of Alvis, Limited, Coventry, has died at the age of 75. He was a member of the Institute of Mechanical Engineers, a Fellow of the Royal Aeronautical Society, and a Fellow of the Royal Astronomical Society.

Dr. JOHN FRASER CARTWRIGHT, who recently completed a considerable amount of research into the hazards of beryllium dust before the opening of the beryllium plant of Sir W. G. Armstrong Whitworth Aircraft, Limited, Coventry, died on March 3. He was 47 and had been works medical officer at Armstrong Whitworth since 1944.

British Blast Furnaces in the December Quarter, 1959

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the fourth quarter, 1959.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	1	—	1	1	4
Renishaw Iron	—	1	1	—	2	1.5	2
Sheepbridge	—	1	1	—	2	2	2
Stanton Ironworks: Stanton-by-Dale	—	—	4	—	4	4	5
Staveley Iron & Chemical	—	—	3	—	3	3.1	4
Stewarts and Lloyds: Corby	—	4	—	—	4	4	4
Wellingboro' Iron	—	1	—	—	1	1	3
TOTAL	—	7	11	—	18	17.6	25

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel Works	—	1	—	—	1	—	1
Darwen & Mostyn Iron	—	—	—	1	1	1	2
Lancashire Steel Manufacturing	—	2	—	—	2	2	3
Summers, John	—	2	—	—	2	1.7	2
TOTAL	—	5	—	1	6	4.7	8

North-West Coast.

Barrow Ironworks	2	—	—	—	2	2	4
Charcoal Iron	—	—	1	—	1	0.4	1
Millom Hematite Ore & Iron	2	—	—	—	2	2	3
United Steel: Workington	2	—	—	1	3	3	3
TOTAL	6	—	1	1	8	7.4	11

Lincolnshire.

Appleby-Frodingham Steel	—	4	—	—	4	3.1	4
Lysaght's Scunthorpe Works	—	3	—	—	3	3	3
Thomas, R., & Baldwins: Redbourn	—	3	—	—	3	2.4	3
	—	10	—	—	10	8.5	10

North-East Coast.

Consett Iron	—	3	—	—	3	3	3
Dorman Long (Steel): Acklam	—	2	—	—	2	2	4
Redcar	—	—	—	—	—	—	2
Bessemer	—	1	—	—	1	1.1	3
Clay Lane	—	2	—	—	2	2	2
Gjers, Mills	2	—	—	—	2	2	3
Normanby Iron Works	—	—	—	—	—	—	3
Skinningrove Iron	—	2	—	—	2	2	3
South Durham Steel & Iron: West Hartlepool	—	2	—	—	2	2	3
Cargo Fleet	—	2	—	—	2	2	3
TOTAL	2	14	—	—	16	16.1	29

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	—	—	2	2	3
Carron	—	—	1	—	1	1	4
Colvilles: Clyde Iron Works	—	2	—	—	2	1.8	3
Ravenscraig	—	1	—	—	1	1	1
TOTAL	1	4	1	—	6	5.8	11

South Wales and Monmouthshire.

Guest Keen Iron & Steel: Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins: Ebbw Vale	—	2	—	—	2	3	3
Steel Company of Wales: Margam	—	5	—	—	5	5	5
TOTAL	1	9	—	—	10	11	12

UK Site for Chrysler?

Chrysler Corporation, the American car firm, has been prospecting in Scotland for a suitable factory site, and areas in England have also been examined. An official of the company agreed that the search had been "concentrated" in the past few months. "We have been looking at sites throughout Britain," he said, "and if we decide on major development we will have several places to choose from." He added, however, that there were "no definite plans" for expansion. It is known that the Chrysler Corporation, which already manufactures Dodge trucks at Kew, has been looking for room to develop. It already has an interest in the production of Simca cars and in the US produces the "Falcon" car.

A.I. Staff Dinner

Over 200 guests attended the 13th annual staff dinner/dance in Falkirk of Allied Ironfounders, Limited (northern group), when Mr. W. H. Smith, chairman of the company, presided and commented briefly on his impending retirement after 61 years' service in the industry. Mr. G. S. Steven, who has worked for many years in one of the subsidiary concerns in Falkirk, is to succeed him as chairman on April 1. Amongst those attending were managing directors Mr. R. L. Hunter (northern group) Mr. A. D. Brown (Forth & Clyde & Sunnyside Iron Company, Limited), Mr. R. G. Sinclair (Falkirk Iron Company, Limited), Mr. J. R. Walker (Callendar Abbots & Dobbie Forbes, Limited), and Mr. D. M'K. Webster (M. Cockburn & Company, Limited).

ISI Meetings

Annual General Meeting

The Iron and Steel Institute is holding its ninety-first annual general meeting at the Royal Commonwealth Society, Northumberland Avenue, London, W.C.2, at the Great Hall, Caxton Hall, Caxton Street, London, S.W.1, and at Church House, Great Smith Street, London, S.W.1, from May 3 to 5. The main technical sessions of the meeting will be devoted to a symposium on "Wide Strip Production." A members' dinner is to be held at Grosvenor House, Park Lane, London, W.1, on May 4, at 7 for 7.30 p.m. and at this the Rt. Hon. R. F. Wood, P.C., M.P., Minister of Power, will be proposing the toast of "The Iron and Steel Institute and Industry."

Meeting in Italy

The Council of the Institute has accepted an invitation from the *Associazione Italiana di Metallurgia* (Italian Metallurgical Association) to hold a joint meeting with them in Milan on Monday and Tuesday, May 30 and 31. The meeting will form part of the special meeting of the Institute to be held in Italy from May 29 to June 11, the arrangements for which the president and Council of the Institute are indebted to the *Associazione Italiana di Metallurgia* for their assistance.

The "special" meeting will be in three sections, and members may register for all three, or any two, or any one section, with or without the special excursion to Florence. Details are as follow:—Section 1, May 29 to June 4, will include the joint meeting mentioned above and visits to works in Milan, Turin, Aosta and Genoa. Members will be accommodated in Milan from May 29 to June 2, and in Rapallo or Santa Margherita from June 2 to 4. Section 2, June 4 to 8, will be in Rome and will include a visit to the works at Terni in addition to sightseeing excursions in and near Rome. Section 3, from June 8 to 11, will be in Naples and will include a visit to Ilva Bagnoli Works as well as alternative visits to Capri, Pompeii and Sorrento. An alternative to the programme for the latter section is a special excursion which will leave Rome on June 8, travel by bus *via* Assissi and Perugia to Florence, and remain there until the morning of June 11.

All arrangements for travel and hotel accommodation are being made for the Institute by Thos. Cook & Son, Limited, in association with Cie. Internationale de Wagon-Lits. The detailed programme and other particulars are available from the secretary of the Institute, 4, Grosvenor Gardens, London, S.W.1.

British Blast Furnaces in the December Quarter, 1959—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of fourth quarter, 1959.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Shelton Iron & Steel	—	3	—	—	3	2.6	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	4	1	—	5	4.6	7
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	10	55	14	2	81	77.7	115

Weekly Average Number of Furnaces in Blast during the December Quarter, 1959, and the Previous Four Quarters

District.	1958.	1959.			
	Dec.	March.	June.	Sept.	Dec.
Derby, Leics., Notts., Northants, and Essex	20	20	18.8	17.7	17.6
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Ches.	6.9	6.9	7	5.8	4.7
Lincolnshire	9.5	8	8	8	8.5
North-East Coast	18	17.4	17	15.6	16.1
Scotland	6.7	6	5.8	5	5.8
Staffs., Shrops., Worcs., and Warwicks.	5	4.9	4	4	4.6
South Wales and Monmouth	10.4	9.5	9.6	9.6	11
Sheffield	2	2	2	2	2
North-West Coast	6	7.4	7	6.6	7.4
TOTAL	84.5	82.1	79.2	74.3	77.7

The following companies have furnaces in course of construction or rebuilding:—Lancashire Steel Manufacturing; J. Lysaght's Scunthorpe Works; Bairds & Scottish Steel.

Severn Tunnel Development

Electrification of the Severn Tunnel pumping station at Sudbrook, near Chepstow (Mon), is to be carried out for the Western Region of British Railways by the Brush Electrical Engineering Company, Limited, a member of the Hawker Siddeley Group, Limited.

Equipment to be supplied under a contract worth more than £100,000 includes a high-tension sub-station containing a 23-panel, 3.3 kv, 75 mva type VBA switchboard incorporating solenoid-operated circuit breakers. A 17-panel control board will provide overall operational supervision of the pumps, fans, auxiliary transformers, and alternators. Also contained in the contract is a requirement for a special lighting and heating system and a comprehensive cabling arrangement.

Power for the installation will normally be taken from the public supply, but two diesel/generating sets will also be installed as standby plant. These will be equipped for automatic starting, with both remote and local indication, and each set will be capable of accepting full load within 15 seconds. The generating sets will comprise a type JVSS 16-cylinder vee-form, totally enclosed four-stroke pressure charged and intercooled diesel engine manufactured by Mirrlees, Bickerton & Day, Limited, another member of the Hawker Siddeley Group. All auxiliaries necessary for the complete station, including air compressors, overhead crane, bulk-fuel storage and transfer equipment, are covered by the contract.

Law Cases

Shunting Risks

Mr. W. R. Jalland, an employee at the Stanton Ironworks Company, Limited's, foundry at Holwell, Leics, was awarded £140 damages at Melton County Court in respect of an accident in December, 1956. Judge D. H. Robson ruled that £100 was for general damages and £40 was for agreed loss of wages. Mr. Jalland also received costs.

The court was told how he had been loading castings weighing half-a-ton each into a railway wagon when a locomotive shunted two other wagons into it. Mr. Jalland saw the impending collision and although in a safe part of the wagon tried to get to a safer place. As he moved, the castings fell over and trapped him by the heels. Mr. Jalland was off work for 7½ weeks and still got occasional pain in his left foot. He was not able to use the foot normally.

The shunter on the locomotive, Mr. Robert Dolby, said that Mr. Jalland did not tell him to stop, as alleged, but merely to wait. This was routine and meant that the wagons should first be coupled on. Mr. Dolby should then wait until Mr. Jalland had loaded his before moving off. Mr. Dolby said he would not advise coupling when someone else was in the wagon but Mr. Jalland had told him it was all right. The impact might have moved Mr. Jalland's wagon about 18 inches. Judge Robson said that because the driver or the shunter refused to stop when asked, they took the risk of what might happen.

Truck Brakes not Faulty

A claim for damages against Edgar Allen & Company, Limited, steelmakers, of Sheffield, by Mr. Akbar Shah, a Pakistani, who fractured his leg in three places in a works accident, was rejected by Mr. Commissioner Fenton-Atkinson at Sheffield Assizes.

It was stated that Mr. Shah had worked for the firm for five months before the accident and was employed as a labourer and occasionally as an electric-truck driver. He was driving a truck with a load of scrap metal to a weighbridge. As he approached the bridge he applied the brakes but they failed and he crashed into another truck. He maintained the company had a truck with defective brakes and failed to maintain the brakes of a vehicle.

Three of the firm's employees gave evidence of having tested the brakes on the truck before and after the accident. They were not faulty.

Giving judgment, Mr. Fenton-Atkinson said: "I should have thought the reasonable way to drive these trucks was with the load in front of the driver. The plaintiff was driving with the load behind him."

Defective Chisel causes Blindness

The maintenance fitter who was blinded in one eye when a flake of steel flew from a chisel, paid "a shocking price" for a momentary lapse, said Mr. Justice Salmon, at Sheffield Assizes. He dismissed a claim by Mr. Arthur Norton, aged 30, for damages against his employers, the English Steel Corporation, Limited. "I must confess I have great sympathy with him, but I find myself bound by the evidence to find against him."

The judge described Mr. Norton as a careful and experienced workman, who failed to notice that the end of his chisel was dangerous before he used it. Mr. Norton admitted the chisel might have been used by an apprentice before he used it, and if that was so he should have inspected it.

Inquiry into Clean Air Act

A nation-wide inquiry into the working of the Clean Air Act of 1956 is being conducted by the National Society for Clean Air. A questionnaire is being sent to the 1,700 local authorities in England, Wales, and Scotland who are responsible for administering the Act to ascertain how well, or otherwise, the Act is succeeding.

The Clean Air Act introduced so many new methods and principles for the prevention of smoke that it has become desirable to learn how effective it is proving to be, what weaknesses or difficulties may have emerged, and whether any changes should be sought.

The questionnaire ranges in scope from the number of cases of dark smoke emission brought to court to the state of public opinion in proposed smoke-control areas, and replies, after being analyzed, will be the subject of reports to be presented for discussion at the annual conference of the Society at Harrogate in October.

Management Conference at Buxton

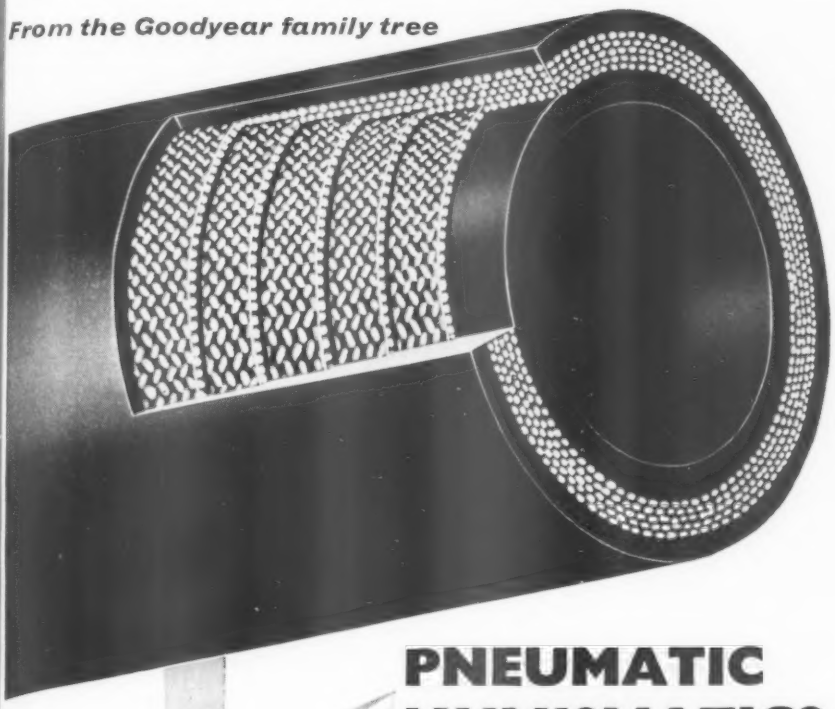
The third joint conference on "Human Problems of Management" organized by the British Institute of Management, the Institute of Personnel Management, and the Personnel Management Advisory Service of the Ministry of Labour opens at the Palace Hotel, Buxton, to-day, Mr. J. L. Longland, Director of Education, Derbyshire, presiding. The opening speaker, Professor D. C. Hague, Newton Chambers Professor (Applied Economics) at Sheffield University, will deal in general with the economic and technical challenge. Subsequent speakers will discuss the human relations implication for managements faced with this changing situation, and on Friday evening the members will split up into a number of informal discussion groups. On Saturday morning the conference will be addressed by Mr. J. Matthews, national industrial officer of the National Union of General and Municipal Workers, on the "Challenge to the Trade Unions," and a closing address will be given by the Chief Industrial Commissioner of the Ministry of Labour, Mr. P. H. St. John Wilson.

Madrid Congress Papers

The *Instituto del Hierro y del Acero* (the Spanish Iron and Steel Institute) announce that they are prepared to sell the individual papers which were presented to the Madrid International Foundry Congress at prices ranging from 12 to 35 pesetas (say, 1s. 6d. to 4s. 6d. each). Thus, any reader wishing to have any particular paper should send to the Editor of this JOURNAL the full title and author (synopses of the Papers were printed in the JOURNAL, December 17 and 24, 1959) and the price of that particular contribution will be quoted. This practice of making individual papers available is one it is hoped other countries organizing the Congress in future will emulate. Selling of the 1959 papers has been placed in the hands of Libreria Cientifica Medinaceli, Duqe de Medinaceli 4, Madrid, 14.

ROVER MOTOR COMPANY, LIMITED, officially announced on March 2 that they are negotiating for a site for a new factory in Cardiff. The new factory project follows talks between the company, Mr. Henry Brooke, the Minister for Welsh Affairs, Mr. Maudling, President of the Board of Trade, and Cardiff Development Corporation.

From the Goodyear family tree



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Publications Received

BCIRA Journal, Vol. 8, No. 1. Published by the British Cast Iron Research Association, Alvechurch, Birmingham; price £6 6s. 0d. or $20 per annum.

Though this issue is labelled Vol. 8, No. 1, it is virtually a new publication as it is an amalgamation of the Association's *Journal of Research and Development* and the *Bulletin and Foundry Abstracts*. Whether or not the Editor, the late Mr. G. R. Woodward, had saved some especially good articles with which to launch the new magazine the reviewer is unaware, but it is certainly a vintage issue. Particularly interesting are the Reports on the "Consumption of Raw Materials in the Foundry" (No. 529) by Mr. M. Martin and Mr. F. K. Garman and the "Batch Desulphurization of Molten Iron by the Calcium-carbide Injection Process," by Mr. R. B. Coates and Mr. J. V. Harding (No. 530). Report No. 529 would have been more easily grasped if here and there the decimals of a ton had been restated between brackets as hundredweights and/or pounds. The reviewer had to do a little sum before he realized that the average consumption of sand per ton of metal melted was 0.19 tons, that is about 42 lb. He feels sure that if the conventional method of expression had been used in Table 2, which gives the figures of consumption of materials in foundries, it would be more appreciated by the average reader. The Report gives figures for coke, limestone, ganister, moulding sand, silica sand, coal-dust and corebinders. They are undoubtedly useful figures to compare with those obtained in one's own foundry practice.

The Report on desulphurization is extremely useful as costs are set out, the worry of low temperature is discussed; the differences in structure, properties and founding behaviour are stressed. The results were based on extensive practical tests.

At the beginning of the *Journal*, news of the Association is given, whilst at the end, there are the usual abstracts, which are so much appreciated by the industry. Those of the BCIRA staff responsible for producing this new-style report of the Association's activities are to be congratulated on having produced an excellent job.

The Metallurgist, No. 1, Vol. 1. Published bi-monthly by the Institution of Metallurgists, 4, Grosvenor Gardens, London, S.W.1. Annual subscription, £3 3s. post free.

Since its inception 12 years ago, the Institution of Metallurgists has provided the metallurgist with a professional organization, admission being by examination, and has created a high status for its members, rapidly being recognized by the academic and industrial interests. Thus this new publication is a welcome addition to its activities, as members have a right to be kept *au courant* with the activities of their professional body. The magazine opens with a message from the president, Professor A. J. Murphy—from which it is learnt that membership now exceeds 4,000—and this is followed by notes on the Institution's activities and a calendar of events for 1960. This magazine is a very human publication: Mr. Murphy's presidential address, and Dr. H. J. Warner's story of metallurgy in Australia contain nothing which could be designated as physics dressed up as metallurgy, but are just interesting accounts of happenings. There is one technical article on "New Horizons in Metallography," by Professor R. W. K. Honeycombe, carrying remarkably good pictures of materials under very high magnifications. The most important article covers the Institution's revised examination requirements and syllabus, where it should be noted that the standard in mathematics has been raised from S2 to S3. Altogether this is an excellent publication.

Tapping, Part I: Relationship between Corehole Size, Tapping Torque and Thread Strength. (Report No. 13). Published by the Production Engineering Research Association of Great Britain, Staveley Lodge, Melton Mowbray, Leicestershire.

For this research, "20" carbon steel En 3B; stainless steel EN 56A; cast iron, and aluminium-alloy DTD 423B were used as test materials. The cast iron used was 10.1 tensile with 131 Vickers diamond hardness number. The composition was C 3.51; Si 1.82; Mn 0.56; S 0.07 and P 0.45. The Report says of this material that it was shown "that the most common type of fracture was thread stripping. It was not possible to complete the tests on the ½-in. B.S.W. and the ½-in. B.S.F. sizes due to the specimens disintegrating under load." It would be interesting to see the experiments repeated using something other than the lowest grade of iron now being specified.

Stone's Bronzes Manual. Published by J. Stone & Company (Charlton), Limited, Woolwich Road, London, S.E.7.

Of an unusual format, this compendium is indexed by coloured tabs for quick reference. An innovation is a visual aid in the form of a table printed on ivorine, carrying a cursor, enabling a quick, preliminary selection of possible suitable alloys. The sections which follow set out the specification requirements for the bronzes and brasses, such as the mechanical properties, in both English and metric standards. The brochure ends with a most useful series of tables detailing British, American, German and French specifications which are the equivalent of Stone's own designations.

The objective of the manual is to enable designers and engineers to select the most appropriate alloy for any particular service for which they have to cater.

Papers and Discussions presented at the Second Recuperator Conference in Paris in 1959.

This conference, the report of which has been received through Metallurgical Engineers, Limited, 5-15 Cromer Street, London, W.C.1, was organized by firms interested in the technical developments of recuperators. It was attended by 250 delegates, and eight papers were presented by technologists from Germany, Great Britain, Italy and the USA. Subjects covered included soaking-pit practice, oxygen and methane heating, atomic-energy applications, steel-tube blast heaters, Cowper stoves, and American recuperator practice. This was the second conference to be held—the first being in 1956. The report is nicely presented in black covers, spirally bound.

Bibliography on the Continuous Casting of Steel, 1956/1959; and Oxygen in Steelmaking, bibliographical series 22. Both published by the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1; price 25s. and 37s. 6d. respectively.

There is not much one can say about these bibliographies except that they both deal with subjects of great commercial significance. For continuous casting it is germane to ask whether this is a heavy metallurgy job or a branch of foundry practice, one which tends to reduce the century-old demand for ingot moulds. The second process is one which is being used extensively in steel foundries.

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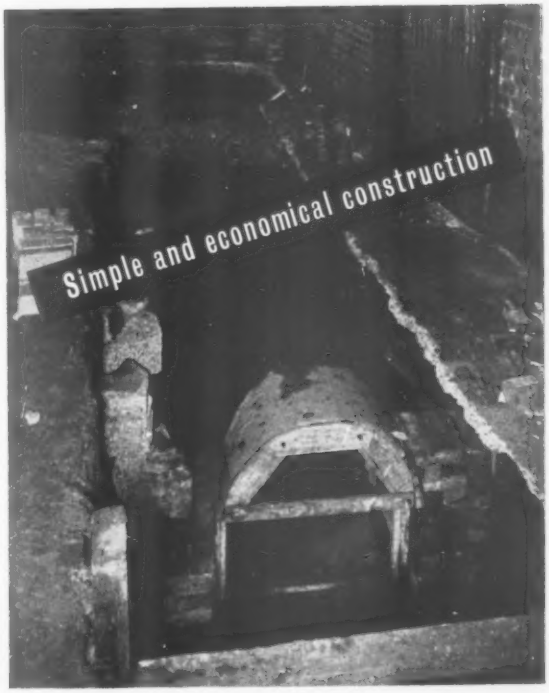

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Raw Material Markets

Iron and Steel

The high level of demand for high-duty castings, which has prevailed for a long period, is maintained, and the majority of the ironfoundries supplying these continue very well employed, with sufficient work on their books to enable them to obtain outputs up to productive capacity. Those catering for the motor vehicle industry are exceptionally well occupied and their current schedule of deliveries is well up to, and in some instances exceeds, previous demands. From many other users of high-quality castings including the steelworks, heavy engineering, and machine-tool trades, power and electrical plant manufacturers, and agricultural implement makers, large tonnages of castings are called for, so that overall the engineering and speciality foundries are employed at good levels.

At the light foundries, those supplying castings for domestic equipment, heating apparatus, and the building trades are reasonably well employed, but could undertake additional work. Most of the jobbing foundries are steadily employed and there is some improvement in business at the textile foundries.

The overall supply of all grades of foundry pig-iron and hematite is still adequate to satisfy the needs of consumers and although some brands of low-phosphorus iron and hematite are limited in quantity, alternatives are available to fill the gap. The previous scarcity of the low-phosphoric irons has been completely overcome by the production of several additional brands and the engineering and speciality foundries now find it much easier to obtain requirements. Hematite makers are much busier, but are able to fulfil the calls made upon them by the foundries, while refined irons are also being delivered satisfactorily. High-phosphorus pig-iron makers have no difficulty in meeting present demands and have tonnages to spare for overseas buyers. Stocks of all grades of pig-iron previously held by the furnaces have been reduced considerably and now deliveries are not so readily forthcoming. For the low-phosphorus irons and hematite there is much more forward buying as the foundries are anxious to ensure regular deliveries to match the work on hand.

There is a heavy demand by the foundries for both cast-iron and steel scrap and continual pressure is being made for heavy cast-iron and machinery scrap which is readily accepted as parcels arise. Foundry coke deliveries are being maintained and ganister, limestone, and firebricks are available on demand.

The re-rollers are able to maintain the high level of outputs for all their products. Orders at most establishments ensure capacity outputs, the only drawbacks being the shortage of suitable labour and the scarcity of steel semis. Good demands continue to be made for small bars and light sections, as well as for reinforcing rods. Home steelworks continue to send forward substantial tonnages of steel semis, but these in many instances fall short of requirements, particularly for 2-in. billets. Arisings at the steelworks of suitable re-rolling quality defectives and crops are readily taken up by the re-rollers.

Non-ferrous Metals

Despite the fall at the end of last week of stocks of refined copper in L.M.E. warehouses by 535 tons to 3,072 tons, market conditions in London have been dull. Demand is somewhat patchy, but on balance, justifies the present price level applicable to cash copper. The sensitive undertone in London is due to the uncertain conditions prevailing in the United States. This is particularly true of the price structure which shows that the smelters' intake price is now down to 25 cents, which suggests that electrolytic copper for delivery in three months' time should be around 31 cents a pound.

This price compares with the current quotation of 35 cents for custom smelters' and 33 cents for producers', and thus indicates a downward revision of the custom smelters' quotation. The general belief is that this will be effected shortly and that the drop will be of the order of 2 cents a pound to 33 cents a pound to bring it into line with the producers' price.

It is reported from Chile that President Eisenhower told the Chilean President that there was no intention of releasing copper from the US stockpile. This made little impact on non-ferrous metal markets owing to the fact that he did not make it clear that he was including all the various stockpiles in existence. As the present outlook strongly suggests that the world price for copper is entering a downward trend, there is little reason to believe that the US would make any releases of metal from any of her stockpiles.

The tin market in London has been under the influence of the International Tin Council's meeting this week. The point of its deliberations would appear to be whether or not to alter the present export quotas set at 36,000 pounds. General opinion favours the quota as remaining unchanged.

However, the price has been sagging in London, in the East, and in the US where it is now below $1.01 a pound and this implies that some dealers, at any rate, consider that the export quotas may be further increased. On the other hand, there is the possibility that the buffer stock manager has been selling.

Lead is steady in London where the price is holding firm around £75 a ton. Overall demand is satisfactory and the immediate outlook is for these conditions to continue. In the US the market is quiet although there is some talk of the price being raised in the next two or three months.

Zinc is steady in London and quiet in the US where demand has slackened somewhat from the automobile industry. The US price is unchanged at 13 cents a pound.

Latest Foundry Statistics

Ironfounding: The Council of Ironfoundry Associations' figures on employment taken on January 2 show a substantial increase over the figures for November and January, 1959. The total for January this year was 127,528, and this compares with 126,642 and 125,845 respectively for November 28 and January 3 last year. The increase in employment of female labour is interesting: over the year 269 more females were employed—an increase of 3.2 per cent.; employment of males increased by 8.1 per cent.

The Hungarian Mining and Metallurgical Society are holding a conference on forging from April 26 to 29. It is to be held at Szabadsag Ter 17, Budapest. One of the papers is to be presented by Mr. W. E. Golcher of Birmingham, the others are of local origin in addition to contributions from Russia, East German Republic, France, Poland and Rumania. In addition to the technical sessions, works visits have been arranged for the participants and a special programme has been arranged for the ladies.

"Aluminium Alloys for Vitreous Enamelling." It is regretted that when printing the article under the above title in the JOURNAL of February 18, an incorrect specification number was quoted for some of the aluminium alloys referred to, the correct number being BS 1490 (instead of BS 1470).

HISTORICAL NOTE

W. J. Mariner & Co. Ltd., of Luton were established in 1909 and have just completed 50 years as Non-Ferrous Founders. They produce castings of very varied types and sizes both in Aluminium and Bronze for all classes of Engineering, and also manufacture very largely for the hatting industry. They are A.I.D. approved.

Baker Perkins Foundry Machinery at work . . . *at W. J. Mariner & Co. Ltd.*

This Turbo 60 Rotating Drum Airless Shot Blast Machine has been installed in the foundry of W. J. Mariner & Co. Ltd., Luton. The Turbo 60, with its effective load of up to 132 lb. and an output of up to 15 cwts. an hour, is easy to maintain and gives high performance at low cost.

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

March 9, 1960

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.: Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over: N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 10s. 0d. to £44 0s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £57 0s. 0d. to £62 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 12s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 15s. 0d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £78 10s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £77 0s 0d. to £80 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent, C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 10¼d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £63 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (under 10 tons).—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (1 ton to 10 tons).—Ship plates (N.-E. Coast), £41 12s. 0d.; boiler plates (N.-E. Coast), £44 2s. 0d.; floor plates (N.-E. Coast), £43 10s. 0d. angles (N.-E. Coast), £38 16s. 6d.; joists (N.-E. Coast), £38 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in. and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d. under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d. nickel-chrome, £99 4s. 0d.; nickel chrome-molybdenum £111 17s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £252 0s. 0d. to £252 10s. 0d.; three months, £237 5s. 0d. to £237 15s. 0d.; settlement £252 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 5½d. per lb. rods, 274s. 0d. per cwt. basis; 20 s.w.g., 309s. 0d. per cwt.

Tin.—Cash, £783 0s. 0d. to £783 10s. 0d.; three months £783 0s. 0d. to £783 10s. 0d.; settlement, £783 10s. 0d.

Lead (Refined Pig).—First half March, £75 10s. 0d. to £75 15s. 0d.; first half June, £74 10s. 0d. to £74 12s. 6d.

Zinc.—First half March, £88 15s. 0d. to £89 0s. 0d. first half June, £87 7s. 6d. to £87 10s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £122 15s. 0d.; rolled zinc (boiler plates), all English destinations, £120 10s. 0d.; zinc oxide (Red Seal) d/d buyers' premises, £100 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 0¾d. per lb. sheets to 10 w.g., 218s. 9d. per cwt.; wire, 2s. 10½d.; rolled metal, 218s. 9d. per cwt.

Brass (Brazing).—BS1400, B3, £163; B6, £219.

Brass (High Tensile).—BS1400, HTB1, £196; HTB2, £217; HTB3, £228.

Gunmetal.—BS1400, LG2, £205; LG3, £214; G1, 1% £271; G1, 1%, £260.

Phosphor Bronze.—BS1400, PB1 (AID released), £30 BS1400, 90/10/1, £290.

Leaded Phosphor Bronze.—BS1400, LPB1, £225.

Phosphor Bronze Strip, etc.—Strip, 312s. 9d. per cwt. wire, 4s. 3½d. per lb.; rods, 3s. 6¾d; tubes, 3s. 6¾d.; chill cast bars; solids 3s. 6½d.; cored 3s. 7½d. (CHARLES CLIFFORD LIMITED.)

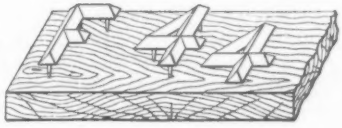
Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide 0.056, 4s. 0½d. per lb.; round wire, 10g in coils (10 per cent.), 4s. 5½d.; special quality turning rod, 10 per cent. ½ in. dia., in straight lengths, 4s. 4½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £70 10s. 0d. to £71 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400 AB1, £255; AB2, £264.

THE RETURN OF STYLE 11

THE **ALUMINIUM**

PATTERN LETTERS WITH THE POINTS



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New Catalogues

Fire-fighting Equipment. To read the 94-page brochure issued by Nu-Swift, Limited, Elland, Yorkshire, reminds one that there are usually great gaps in one's knowledge of fire-fighting and of the variety of appliances which can be used for the extinguishing of fires. Each industry has its own special problems and from Nu-Swift special data sheets are available for a large number of industries—including the foundry (No. 494). The brochure describes, using clear line drawings and by specification, the various models of fire extinguishers which the firm manufactures. It is the type of catalogue which should find a place in every purchasing officer's library as the fire risks involved in any factory are never static under to-day's conditions.

Vibrating Conveyors. In *Bulletin* No. 307, Acme Conveyors, Limited, Bradford Street, Walsall, Staffs, describe the Ajax-type of vibrating conveyors and screens, which the company manufactures under licence from Vibratory Conveyors, Westfield, NY, USA. The conveyors are made in three basic types, open, closed, and tubular pan, and details are printed of the interesting reciprocating drive. An illustrated description is given of a combination screen and conveyor which is serving a small bronze foundry. This unit separates the sand from other matter, and discharges the refuse at a separate point. Vibrating conveyors have found their way into some of the largest foundries.

Wood and Metal Patterns. For distribution from their stand at the Engineering Materials and Design Exhibition, J. J. Harvey & Pressurecast, Limited, Lime Bank Street, Manchester, 12, prepared a new 12-page brochure. This consisted first of an opening statement as to lines of manufacture undertaken by this seven-year-old and fast-growing enterprise. Two well-illustrated pages are devoted each to wood patterns, metal patterns and glass-reinforced resin types. It is obvious from the brochure that no modern aspect of pattern production and the like has been neglected.

Asbestos Millboard. In publication No. MA.3, Turner Brothers Asbestos Company, Limited, Rochdale, cover the whole question of asbestos millboard in general terms by showing its application in a multitude of industries. Technical data are given of six standard qualities, but apparently these do not meet with all industrial requirements and people interested are asked to submit their problems.

Magnetic Swarf Separators. Publication No. 147 issued by Rapid Magnetic, Limited, Lombard Street, Birmingham 12, will be of interest to those who are faced with the task of efficiently separating ferrous swarf from non-ferrous material. It describes type J.Y.P., which is a non-electric swarf separator, using Alcomax magnet units built into a self-contained, push-button, motorized plant.

Electrochemical Etching. Whilst the foundry can easily arrange for patterns to trade mark castings, there arise numerous cases where etching is obviously preferable. A leaflet received from Electromark (G.B.), Limited, Harlequin Avenue, Great West Road, Brentford, Middlesex, details their Electromark process which enables the marking of components to be carried out in a corner of one's own works. One interesting claim, amongst many, is that a mark made by this process is still visible after heating up to 600 deg. C., and that it can still be seen after plating or anodizing. Five types of the electrolytic etching equipment are available.

Motors for Cranes, Hoists and Lifts. Lancashire Dynamo and Crypto, Limited, Trafford Park, Manchester 1, in publication No. ML 88 illustrate, using excellent photographs, a variety of cranes by different makers all of which incorporate LDC motors for their operation. The picture of a crane used in connection with a reservoir in Tasmania is particularly impressive.

Pumps. Three leaflets No. 1/514, 1/490 and 2/491 have been received from Ransomes & Rapier, Limited, Waterside Works, Ipswich, all describing and illustrating pumps with capacities ranging from 10,000 to 25,000 gall. per hour. They are all portable and are adapted for diesel, electric or independent drive.

Book Reviews

Data Sheets on Moulding Sands. Published by the British Steel Castings Research Association, East Bank Road, Sheffield, 2; price 30s., post free.

This publication is divided into two parts, the first revealing in a very interesting manner the fundamental knowledge which every foundry executive should possess. For instance, a study of Table II shows the production of sands for foundry use during the decade 1949 to 1958. It would appear that in 1954 the use of synthetic sand went ahead, alongside the increase in the use of moulds built up from prefabricated parts. This trend has since increased and with it there has been a consumption of sand per ton of castings which on a superficial examination would seem to increase with the passage of time. This does not represent extravagance, but increased realization that the production of good castings demands the addition of plenty of new sand.

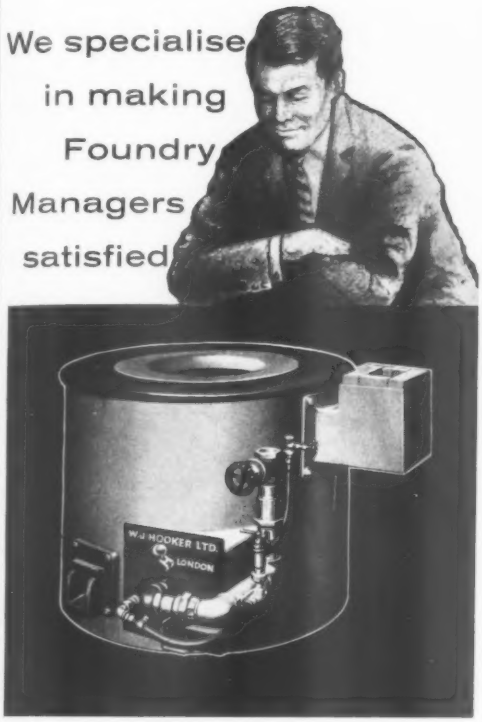
The second part is meant not for casual reading but for reference purposes, and in this field the book forms the most useful guide to the properties of foundry sands—covering no fewer than 45 sources—that the reviewer has encountered. The only figure which an executive needs to complete the information is the cost of the sands, when delivered to his works.

V. C. FAULKNER.

Training of Technical and Scientific Staff. Published by the International Bureau of Education, Geneva; price 16s. 9d.

If potential purchasers of this book imagine that it will help organizations or firms with which they are connected to solve their staffing problems, they will be disappointed. The report is a collection of data resulting from replies to a questionnaire sent to the Governments of 50 or more countries. It asked what these countries were doing towards ensuring the future supply of technologists and scientists for industry and research; the position with regard to teaching staff, and similar questions. The book is out of date before publication and thus about as interesting as Sunday's joint on the following Wednesday. In the reviewer's opinion the staff employed in the collection and collating of information of this nature could have been better employed on other activities of more general use and interest.

BRUCE, PEEBLES & COMPANY, LIMITED—Mr. Duncan McDonald has joined the board. He was appointed chief engineer last year.



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Company News

C. C. WAKEFIELD & COMPANY, LIMITED, manufacturers of lubricants, etc., of London—The company has acquired the entire share capital of De-Corrosion Service (Norwest), Limited, for £20,000 cash.

THOMAS BLACKBURN & SONS, LIMITED, structural and general engineers, of Preston—No dividend is declared on the preference shares for the half-year to March 31, 1960, as against a dividend paid for the period to March 31, 1959.

J. HEWITT & SON (FENTON), LIMITED, manufacturers of industrial and domestic refractories, of Stoke-on-Trent—The dividend for 1959 is raised to 17½ (15) per cent. The net profit was £27,068 (£14,786), after tax of £20,200 (£18,600).

RANSOME & MARLES BEARING COMPANY, LIMITED—The interim payment is being raised from 5 per cent. to 6 per cent. on account of the year ending June 30, 1960. The 1958-59 total distribution of 17½ per cent. included a 2½ per cent. bonus.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—An offer has been made for the £250,000 capital of Sydney S. Bird & Sons, Limited, electrical engineers, etc., of Poole (Dorset), on the basis of one Gas Purification & Chemical Company 5s. share for every two 4s. shares.

AURORA GEAR & ENGINEERING COMPANY, LIMITED—At the recent extra-ordinary meeting, the purchase of the issued share capitals of the companies comprising the Watling Street group was approved. It was stated that Aurora Gear may consider further acquisitions in the future.

HEPWORTH IRON COMPANY, LIMITED—The funds necessary for the purchase of the capital of the Albion Clay Company, Limited (£380,000) have been provided initially out of the group's resources and £4,000 has been paid as compensation to two Albion directors who have retired. It is estimated that the 1959-60 results should not differ materially from those of the previous year when group profit was £33,437.

W. G. ALLEN & SONS (TIPTON), LIMITED, engineers, of Tipton (Staffs)—In view of the difficult trading conditions which have been experienced in the first half of the current financial year to March 31, 1960, consideration of the dividends on the ordinary capital is to be deferred until the full year's accounts are available. Two interim dividends of 2½ per cent. each and a final dividend of 10 per cent. were paid for 1958-59.

STANDARD RANGE & FOUNDRY COMPANY, LIMITED—As forecast, the company, which was made public last October, is paying a final ordinary dividend of 15 per cent. on £250,000 capital as increased by a scrip issue. An interim of 10 per cent. on capital of £90,000 has already been paid. For 1958, an interim of 20 per cent. was followed by a final of 10 per cent., on capital of £90,000. Net profits were returned at £70,709, against £57,238. As already announced, the directors intend to pay a total of not less than 18½ per cent. on the present capital for 1960.

RUGBY PORTLAND CEMENT COMPANY, LIMITED—Record group net profit for the fourteenth successive year is announced by the company, which is repeating the dividend at 25 per cent. for 1959 on the £1,750,000 ordinary capital as raised from £1,500,000 last March by a rights issue. Payment on the £50,000 "A" capital is being increased from 150 per cent. to 200 per cent. Capitalization of £250,000 in a one-for-seven ordinary scrip issue is also proposed. Trading surplus of the group expanded from £1,552,275 to £1,933,900. Net profit was £970,704 (£851,383). Group deliveries of cement in 1959 were an all-time record.

CENTRAL WAGON COMPANY, LIMITED—The company, which last May made a capital distribution of 1s. per 10s. unit, now proposes to make a further distribution of 2s. per unit, costing £150,000, from capital reserves. The chairman, Mr. F. T. Hanson, points out that the liquidation of a subsidiary resulted in a capital surplus in the holding company's accounts of £131,893. Due to a reduction in stocks and work in progress, liquid resources have been very much increased. Unsuccessful attempts have been made to employ these resources more profitably, and the directors will, therefore, in the near future give "careful consideration" to further capital distribution. Mr. Hanson says that a large number of repairers have already disappeared and there must necessarily be reasonably full employment of those that remain.

MONSANTO CHEMICALS, LIMITED—Group net profit rose from £1,016,274 to £1,693,266 in 1959 and the dividend is raised by 1½ per cent. to 15 per cent. with a final of 10 per cent. The parent company's sales were a record at £18,427,505 (£15,426,633), and the net income, after tax of £929,211 (£661,526), was £1,336,424 (£657,423). The improvement in the volume of sales, to which the chairman (Sir Miles Thomas) referred last August, continued during the second half of the year at even greater momentum. In the result, says Sir Miles, the value of goods sold during 1959 was substantially higher (£18,427,505) than the previous best figure of £15,683,272 achieved in 1957. Direct export business accounted for 37 per cent. of total sales, a contribution of £6,877,980 to the turnover. The year saw notable expansion of operations, in particular the £3,500,000 polyethylene plant at Fawley, which was completed to plan and went on-stream smoothly.

Successful Bid for Redler's

Rival bidding for Redler Industries, Limited, by Ley's Foundries & Engineering Company, Limited, and Cozens & Sutcliffe (Holdings), Limited, has ended with the latter company successful. Philip Hill, Higginson, Erlangers, Limited, has announced that the Ley's offer has lapsed as the conditions have not been fulfilled.

It was stated on February 26 that the Redler board considered that its existing business would be complementary to the business of Cozens & Sutcliffe and therefore should increase its potential earnings.

Cozens & Sutcliffe's latest bid was a share-for-share exchange plus 1s. cash. Redler's profits on trading for the year to September 30, 1959, are much the same as in the previous year at £162,776 and net assets amount to £643,272 (£645,881).

Three Companies link for Overseas Projects

To undertake contracts for large fertilizer and chemical projects overseas, Chemical Works Projects, Limited, has been formed by P. G. Engineering, Limited (a member of the Power-Gas group), Humphreys & Glasgow, Limited, and Simon-Carves, Limited. The joint company will thus be able to call on "extensive" resources.

The board will be Mr. R. W. Rutherford (chairman), Mr. J. P. V. Woolam, and Mr. G. Gresle Farthing, each having an alternate director. Registered office will be Simon House, 28-29, Dover Street, London, W.1.

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/6 extra (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRYMAN, 42 years. Present position Foreman, 12 years' supervisory experience iron and steel, jobbing and mechanised, seeks position where initiative is required. Wide experience plus technical qualifications. No objection to building up foundry. Area preferred: S. Eastern England. Box FM453, FOUNDRY TRADE JOURNAL.

EXPERIENCED REPRESENTATIVE, A.M.I.Mech.E., based on Birmingham, having extensive contacts throughout the Midlands and beyond for Malleable Iron Castings, wishes to represent a reputable foundry. Own car. Box EX451, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

MERSEYSIDE IRON and Non-Ferrous Foundry with capacity of 120 tons per month invites applications for the position of MANAGER. Applicants must be capable of controlling Sales, Production, Quality, Labour and General Administration. A sound knowledge of Metallurgy and Sand Control techniques is essential, together with extensive experience of semi-mechanised production, loose pattern, and shell moulding. Non-contributory Pension Scheme and mileage allowance or car provided. Apply to Box ME447, FOUNDRY TRADE JOURNAL.

PATTERNSHOP FOREMAN required for expanding Patternshop of well-known medium sized Malleable Iron Foundry. Applicants should have experience in high-class wood and metal work. Knowledge of pressure cast plates and Epoxy Resin patterns would be an advantage. Previous supervisory experience desirable. Applications, stating age, qualifications and experience, to: PERSONNEL OFFICER, BRITANNIA IRON & STEEL WORKS, LIMITED, Bedford.

FOUNDRY METALLURGIST required for Ferrous Foundry (mechanised) situated in South-East England. Cupola control essential and must have practical experience in sand control. Send details of experience, age and salary required, to Box ME459, FOUNDRY TRADE JOURNAL.

ASSISTANT to Foundry Manager required by Jobbing Foundry, South Eastern district. Estimating experience an advantage. Write, giving details of practical and technical knowledge, age and salary required, to Box AT436, FOUNDRY TRADE JOURNAL.

METALLURGIST—qualified. Age approximately 28 to 40. Experienced Electric Furnace Melting. Required to take charge of Laboratory and expand Laboratory services to Foundry. Good prospects for capable person. Apply WORKS MANAGER, THE WEST LOTHIAN STEEL FOUNDRY CO., LTD., Hardhill Works, Armadale, West Lothian.

ANALYST / METALLURGIST.—An Analyst or Assistant Metallurgist is required to take control of a small laboratory carrying out routine analysis of cast irons and alloy steels. Applicants must have experience in this field and ability to train junior staff. Box AM454, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FOUNDRY FOREMAN required for Ferrous Foundry (mechanised) situated in South-East England. Must have experience in machine moulding and be able to control labour. Send details of experience, age and salary required to Box FO450, FOUNDRY TRADE JOURNAL.

IRON FOUNDRY FOREMAN required for Foundry producing castings up to 40 tons in weight with a weekly output of 40 tons and upwards. Previous experience in production of iron castings for Electric Power Generating Plant and auxiliaries is desirable though not essential. Pension scheme. Canteen. Applications, giving age, experience and qualifications, to be made to Box FO458, FOUNDRY TRADE JOURNAL.

SKILLED GENERAL MOULDERS required, used high-class engineering work 1 cwt. to 2 tons. Piece-work earnings £20-£25 for good men. Every assistance given to obtain lodgings, etc. Apply JOHN WHEELER & SON, Railway Foundry, Clay Lane, Langley.

FOREMAN required—Medium size expanding Aluminium Gravity Die Foundry, Birmingham area. Must be experienced and held similar position. Good prospects, pension scheme. Box FR455, FOUNDRY TRADE JOURNAL.

CHIEF INSPECTOR required for modern foundry situated in the West Riding of Yorkshire. Knowledge of castings' requirements essential and some experience of foundry inspection desirable. This is a progressive post with an expanding Company, and the successful applicant will possess initiative and the ability to represent a wide range of customers' interests. Write giving details to Box CH454, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

METALLURGICAL CHEMIST required to take charge of laboratory employing people on Chemical and Metallurgical Analysis in connection with a large Iron Foundry situated in a pleasant area of the South Coast. Housing available. Please reply in writing, stating age, experience and salary required. Box MC438, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE required in South-West area, extending North to the Midlands, for well-known manufacturers of Foundry Sand Binders. Salaried appointment with expenses, bonuses and car provided. Applicants should be foundry qualified as well as having practical experience with moulding and core sands. State personal details, particulars of education and experience. Box TR457, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN.—Well established aluminium foundry requires Foundry Foreman with practical experience in Gravity and Pressure Diecasting, moulding and melting of aluminium alloys. To take charge of Foundry employing 40/50 personnel and must be accustomed to handling labour. Staff appointment for capable person. Apply in writing giving details of experience and salary required, to THE NORTHERN DIECASTING COMPANY, LIMITED, Norcastal Works, Burnley, Lancs.

RADIOLOGIST required to take charge of X-Ray and Gamma Ray Department attached to Investment Foundry. A.I.D. approval a necessity for ferrous alloys, and preferably for light alloys and brass. Factory situated in Birmingham area. Write, giving details of age, experience and salary required, to Box RA6, FOUNDRY TRADE JOURNAL.

MSL *have been retained to advise on the appointment of a*

FOUNDRY MANAGER

for a company in Yorkshire engaged in the manufacture of textile machinery and in general engineering. The Foundry Manager will be responsible to the Works Manager for the efficient operating of the pattern shop and foundry, which employs approximately 130, and is engaged on a wide range of castings, mainly in cast iron, on a batch production basis for both the factory and outside customers.

Candidates, who should have served an apprenticeship, must have extensive experience of modern foundry practice and should be in a similar position. Although production is mainly in cast iron, a knowledge of non-ferrous metals and experience of rate fixing and bonus schemes would be an advantage. Professional qualifications in metallurgy or mechanical engineering would also be helpful.

Preferred age 35-45. The starting salary will be by negotiation, will be based on experience and ability and should be approximately £1,750.

Please send brief details in confidence, quoting reference GT.2279, to M. B. Berks. In no circumstances will a candidate's identity be disclosed to our client unless he gives permission after a confidential interview at which he will be given full details of the appointment.

MANAGEMENT SELECTION LIMITED, 17, Stratton Street, London, W.1.

SITUATIONS VACANT—*contd.*

HAND MOULDERS required for small Jobbing Foundry. Experience of non-ferrous metals essential. Apply in writing, DORSET IRONFOUNDRY CO., LTD., West Quay Road Poole, Dorset, stating age and previous experience.

APPLICATIONS are invited for the position of ASSISTANT FOUNDRY FOREMAN at a Midland Ironfoundry. Applicants should state age, experience and salary required to Box AP457, FOUNDRY TRADE JOURNAL.

HAND MOULDERS required for small Jobbing Foundry. Experience of non-ferrous metals essential. Good wages and conditions. Apply to PERSONNEL DEPARTMENT, E.M.I. Ltd., Blyth Road, Hayes, Middlesex.

BUSINESS OPPORTUNITIES

LANCASHIRE and Cheshire Agent, many years' experience with general sales, own saloon car and office, will be pleased to hear from a manufacturer wishing to be represented in this area. Box LA451, FOUNDRY TRADE JOURNAL.

FOUNDRIES FOR SALE

SALE.—GENERAL IRONFOUNDRY AND REPAIR WORKS, established 1947. 10,000 sq. ft. covered with 8,000 sq. ft. open yards. Cupola 4 tons per hour. Three Overhead Cranes each 10 tons, 5 tons and 3 tons capacity. Reasonable price. Apply: JOHN BRYCE, Brycedale Foundry, Kirkcaldy, Fife. Tel. 2109.

MACHINERY WANTED

IRON MOULDS for casting straight Bars in groups 1 in. diameter or section × minimum 2 ft. long. Box WA452, FOUNDRY TRADE JOURNAL.

PLATE MOULD CONVEYOR wanted. Plate size required 4 ft. × 2 ft., preferably 90 Plates or more. Please send full details to Box PL452, FOUNDRY TRADE JOURNAL.

WANTED.—New or secondhand 2 ton Geared Foundry Ladle. Also 5 to 7 cwt. ladles on wheels. Messenger Co. Ltd., Loughborough.

ALL TYPES of BMM Moulding Machines, any condition. Good prices paid. Box 455, FOUNDRY TRADE JOURNAL.

WANTED—5/10 cwt. capacity Core Sand Mixer. Fordath bottom discharger or similar. Box WA458, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

10 CWT. Cupolette complete with blower and platform. One Brass Furnace, 150 lb. capacity, gunmetal, coke fired. Variety of Moulding Boxes.—Box CU456, FOUNDRY TRADE JOURNAL.

SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. RENSHAW (MACHINERY), LTD., Misterton, nr. Doncaster. Tel.: Misterton 202.

FOR SALE
CONSTRUCTIONAL Cupolas, 4 ft. 6 in. and 5 ft. diam. Dry Spark Arrestors, Blowers, Skip Hoists.
Tilghman Wheelabrator conveyor type Shotblast M/c.

S. C. BILSBY & CO.,
Hainge Road, Tividale, Staffs.
'Phone: Tipton 2448.

MACHINERY FOR SALE—*contd.*

MOULDING MACHINES

PNEULEC HERMAN Jolt Rollover: 4,000-lb.
B.M.M. Jolt Squeeze Turnover: Type ATO, AT4, AT5, RD3/5.
B.M.M. Hand Squeeze Turnover draw, TO3, 30 × 20 table.
Coleman-Wallwork Shockless Squeeze Straight Draw. WT563c.
Coleman-Wallwork Jolt Squeeze Turnover patt. draw: WT562a and WT562c.
Coleman-Wallwork Type "CN" Pneu. Jolt Squeeze.
ADAPTABLES: Large and small sizes.
Britannia Hand Ram pin lift 26 in. × 16 in.
Britannia Pneu. Jolt 22 in. × 26 in.
McNab 16 × 14 Jolt Sq. patt. draw.
Also in stock: Sand Mills, Mixers, Fettling Grinders, Dust Collectors, Air Compressors, Blowing/Exhausting Fans, etc.

S. C. BILSBY & CO.,
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SHOTBLAST PLANT: Tilghman Multi Rotary Table TS4, complete with all electric motors, electric control and dust extractor. Excellent condition. Low price for quick sale. Apply Box SP407, FOUNDRY TRADE JOURNAL.

FOUNDRY EQUIPMENT—SP.1000 fully automatic Shell Moulding Machine. Little used. Offers. Apply: J. J. TAFT, Idoson Motor Cylinder Co., Ltd., Hainge Road, Tividale, Tipton, Staffs.

FOR SALE.—One Jackman Model OA Cupola, 10 cwt., complete with loading platform, in perfect condition. Price £120. MIDCO STEAM SPECIALITIES, LTD., Queens Drive, Nottingham.

ACME CORE STOVE FOR SALE

ACME GAS-HEATED Two Loop Continuous Vertical Core Drying Stove, about 16 ft. × 9 ft. 6 in. × 27 ft. 7 in. high, with Electrically Operated Automatic Loading and Unloading Device, working in conjunction with Parker-Mitchell Electrically-driven Continuous Pendulum Chain Conveyor, about 240 ft. long, having 43 trays, 7 ft. 6 in. × 2 ft.; also Parker-Mitchell Overhead Travelling Electric Hoist Block and Runway, with ¾ cwt. Bottom Discharge Bucket. The electrical equipment is for A.C. 3 phase 50-period 440 volt supply, with Dewhurst and Igranic Contactor Control Panels. For further particulars and appointment to view please reply to: MESSRS. WEIR FOUNDRIES, LTD., Pontefract Lane, Leeds.

TWO BMM H.P.L.3 Pinlift Moulding Machines, as new.
Two 750 lb. Pneulec Jolt Rollover Moulding Machines.
Two Pneulec Jolt Squeeze Skirt Lift Machines. Table 16 in. × 17 in.
One BMM T.O.2 Hand Squeeze Rollover.
Five Armstrong Pneumatic Rammers.
1-Ton Roper Rotary Receiver, as new.
30-cwt. Oil Bath Geared Ladle.
2-Ton Oil Bath Geared Ladle.
3-Ton Crane Ladle.
10-cwt. Racking Hoist with Trolley and Ladle.
Pneulec Core Sand Disintegrator.
Sinex Shake Out Beam, 1 ton cap.
Jackman Shotblast Cabinet, 3 × 3 × 3, complete with Dust Extraction Broom, Wade Compressor and Motor.
50 Pairs Jackman Steel Moulding Boxes, 25 in. × 20½ in. × 4 in., fitted Stays and Nitrided Bushes.
50 Pairs Bilston Steel Boxes, 14 in. × 21 in. × 4½ in.
200 lb. Aluminium Capacity Bale Out Oil Fired Furnace, complete.
BOX TB456, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE—*contd.*

ANSON Shell Moulding Machine for sale. HARDYPICK, LIMITED, Sheffield, 8.

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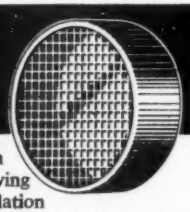

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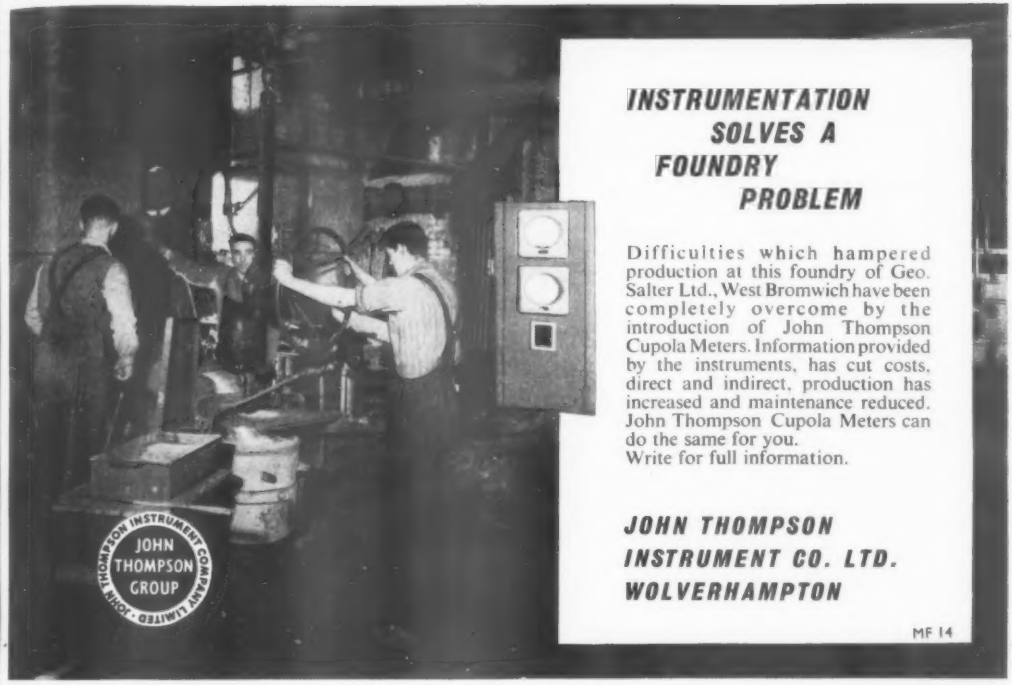

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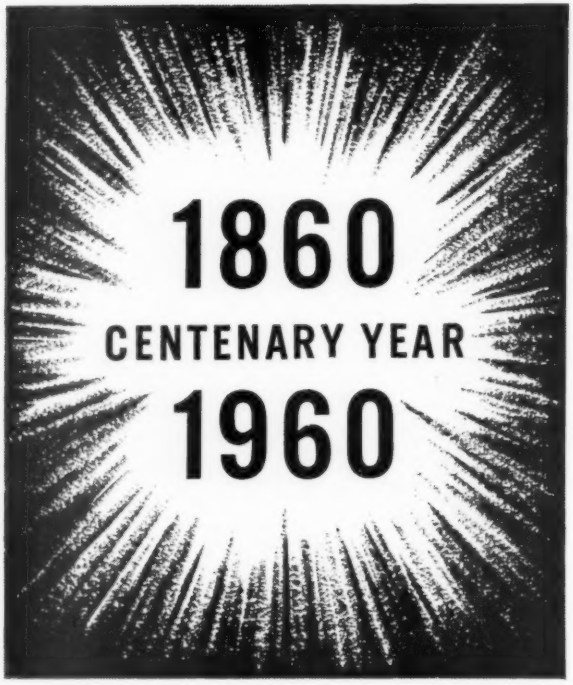

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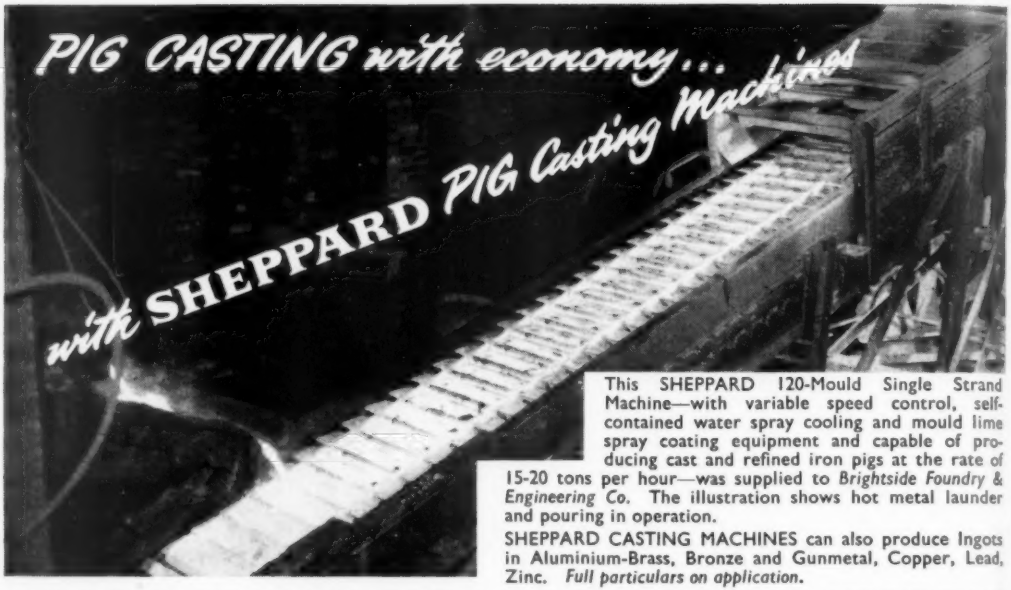

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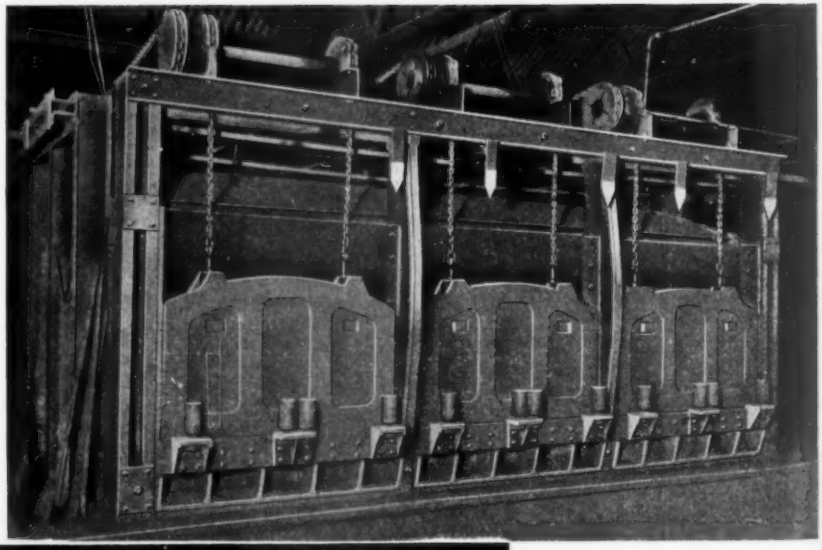

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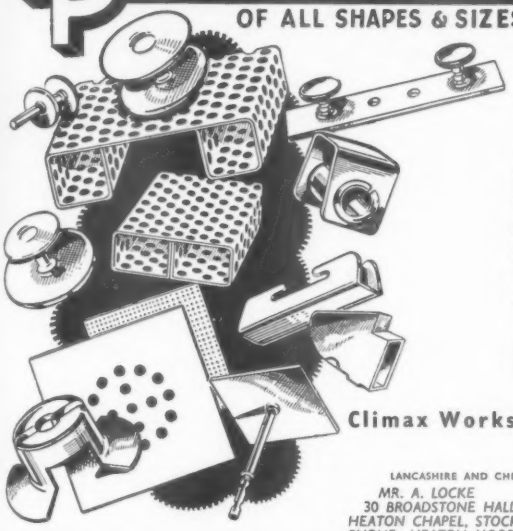

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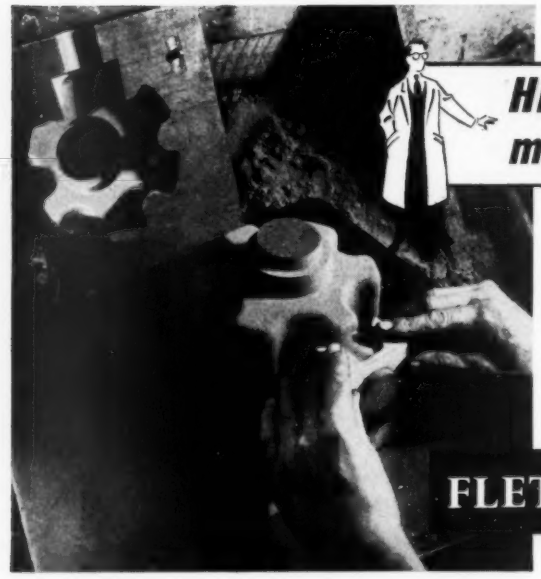

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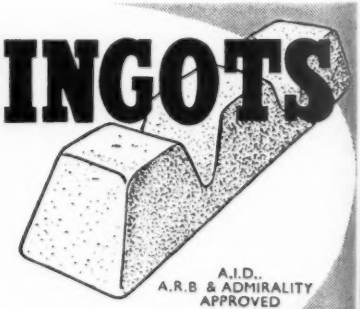

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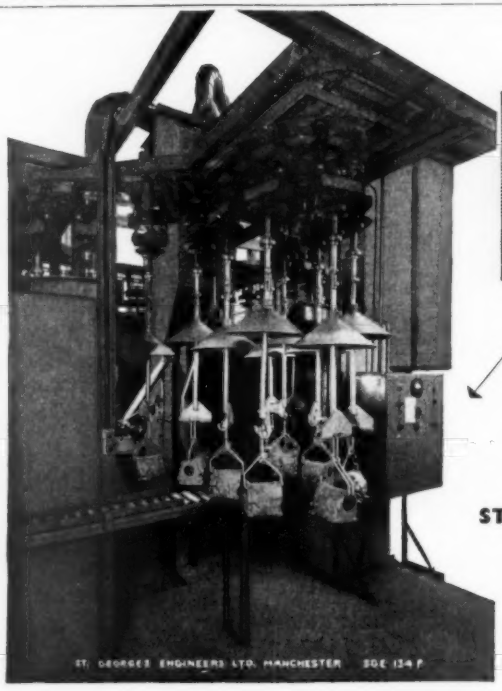

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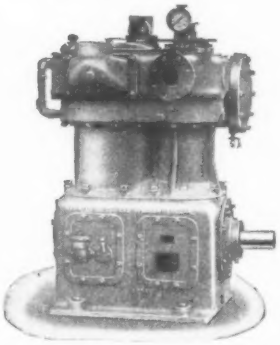

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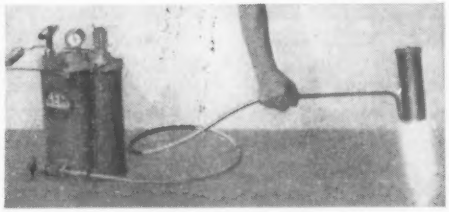

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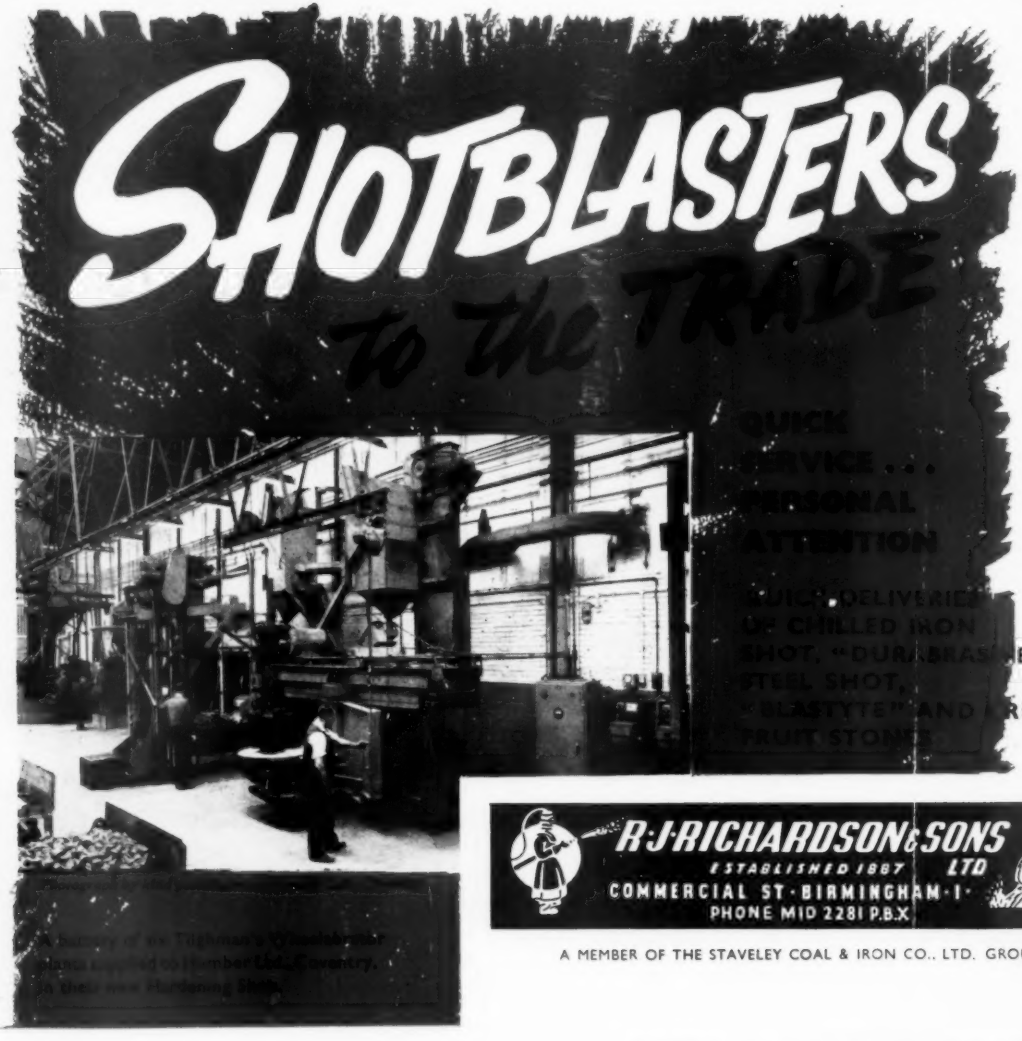

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